GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED — OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXXVI., No. 3308.] WEDNESDAY, OCTOBER 13, 1926. [78TH YEAR.

EDITORIAL NOTES.

New Experiences.

MODERN experiences, awkward and costly as they have been, have not been altogether destitute of value for the gas industry. It has created for itself a new reputation, though one which has been deserved for many years. We are led to consider the position in the light of the past few months' history by the excellently limned picture of it which Mr. Herbert Lees, of Hexham, presented in the address he delivered last Friday from the Presidential Chair of the North of England Gas Managers' Association. Although the gas industry did not know with certainty until the actual event that there would be a stoppage in the coal industry, its responsible men took no risks; and May 1 saw them prepared to carry on their service to the community as usual. *Experientia docet.* There was the experience of the three months' stoppage in 1921; and, as Mr. Lees pointed out, with that before them, gas managements stocked their stores and laid their plans. Thus the industry made it possible for the nation to endure quietly and patiently the stoppage of its coal supplies—particularly in its domestic life. In fact, the industry has again proved itself a national insurance agency in a great emergency. It has stood in the path of disaster, and so has done material service in lightening the blow.

This has been due not only to prevision in respect of coal stocks, and the purchase of exotic coals at high prices per ton, but the advances in coal carbonization and in flexibility of gas production have, in the exigent circumstances, rendered aid which was not at one time available. There have, of course, been anxieties behind the scenes; but, as Mr. Lees says, inconvenience has not been felt to any appreciable extent by the consumers. Indeed, it is not too much to say that many people have only been kept informed of the continuance of the coal stoppage by the newspapers, and not by their own discomfort. Our electrical friends know of the service of the gas industry to the country; they know that the electricity systems could not have performed an equal service for the same expenditure of raw material; and they are fully conscious that the plant of their industry would have fallen far short in capacity for meeting the demands for heat which the gas industry has been able to satisfy. The public have shown their appreciation of this. There has been no grumbling over the compulsory increases in the price of gas; and in some districts there have been large percentage increases in consumption, while, at the other end of experiences, there has been economy, and consequently an actual decrease in sales. The public realize that what cannot be helped must be endured; and they know that the gas undertakings will not keep their charges at the higher level a day longer than is necessary—inasmuch as commercially it does not pay to do so; and it prevents higher dividends and proper market values for stocks. Despite the higher price for gas, there is another experience to which Mr. Lees directs attention, and one which appears to have been universal in the country. It is the sharp upward flight in the call for cookers and other gas-heated appliances of all kinds, to grapple with which has caused some gas service departments to be hard pressed. In all this there is the evidence of an enhanced reputation for gas among the public for reliability. This will be of immense value to the industry in its future trading.

There is another lesson in the present experiences. A much larger use has been made of water gas—carburetted and otherwise—to supplement coal gas. In some cases there have been times when certain undertakings, as is mentioned in the address, have had to distribute neat carburetted water gas. But, notwithstanding, during the coal stoppage, there have been few accidents; and the inane talk about carbon monoxide poisoning has not been a feature of the newspapers recently—though we have been passing through the annual "silly season." Again, Mr. Lees points out that less has been heard during the strike of the advocacy of the application of low-temperature carbonization to the town-gas business. It sometimes requires an extraordinary illustration to convince people that their ideals are inapplicable to certain circumstances. We have had this big demonstration during the coal stoppage: The stocks of coal which were in the possession of the gas industry at the beginning of the strike would not have placed at the disposal of the community so much potential heat energy as they have done in the form of gas and coke, had they been used for either the production of electrical energy or low-temperature coke and a low therm yield of gas.

Mr. Lees takes us into other experiences, which are technically valuable, though obtained at great cost. He reflects what has been almost universally learned as to the varied values of imported coal, carbonized under British conditions. Silesian coal has not had (to use his words) an enthusiastic welcome. Westphalian coal has been of a less unsatisfactory character. The thermage is not bad; but some varieties hang up in the retorts, and produce dirty coke, while certain screened sorts, with low ash content, give a good quality coke. From the gas-making point of view, the American coal has been the most serviceable, though, again, some varieties have given trouble in vertical retorts through holding-up; and the coke has not been of the most favourable order. Even with a low ash content, a good deal of clinker has been found in the producers, with a resulting lowering of heats, which contribute to poor results.

These are examples of the strike-time experiences referred to in the address. There are others; and among them we are glad to see the tribute which the President pays to the loyalty of the workers in the gas industry. This loyalty is due not only to the employment conditions that rule within the industry, but to the higher sense of duty and greater intelligence that obtain among both leaders and men (which enable actualities to be taken into account) than are unfortunately found among the leaders and sections of the men in the coal industry, where the sophistries of the longest tongue and smallest brain have potent ill-effect.

So far, so good. Taking the circumstances into consideration, there is reason for satisfaction that the industry stands where it does in relation to this lamentable stoppage. But we have to look forward; and Mr. Lees places his finger upon various movements which will be to the advantage of the industry. There is the National Fuel and Power Committee. Had this body—constituted of distinguished men, with knowledge of fuel

utilization and applications—been in existence a few years ago, many of the misconceptions of the past (perhaps including the Government electricity scheme) would have quickly had their quietus, and real progress in heat and power provision would have been made. There is also recognition in the address of the intrinsic value of the work of the National Gas Council; also of the need for personal effort; and good advice is given regarding the policy of amalgamations. These matters have received consideration in these columns on former occasions. We will therefore leave them with the remark that the address provokes gratification over achievement, and emphasizes those influences which enliven in our minds the certainty of a greater future for the industry than is represented by even the high position it occupies to-day.

The Last Throw.

The anticipated has happened in connection with the stoppage in the coal industry, but, so far, resolution has not been (if it can be) converted into deed. It has been expected that the Miners' Executive, with their record of unintelligent policy, would attempt something still more rash before they relinquished the insane struggle into which they led more than a million men. Their new resolve is the most idiotic of all they have made since the beginning of the dispute. It has been described by one labour writer as "the gambler's last throw." It follows upon what is termed the "voting" in the coal areas on the Government's proposals. The "voting," it is claimed, represents the views of the miners; but it is well known that the manner of it was farcical, and does not by any means portray the considered opinions of the men most concerned. But quoting the figures as presented at the district delegates' conference in London last week, they show only 42,000 men in favour of the Government proposals, and 737,000 against. Already there are over 200,000 miners at work, excluding the safety men who are maintaining the working conditions in the mines which are not yet operating. However, the conference of delegates on Thursday of last week accepted these figures as emphatically rejecting the proposals of the Government. The delegates and the Executive of the Federation were pleased to have them as a defence of their strike policy; but they are as fully aware as other people that the figures have no representative value.

However, the Government having given the Miners' Federation clearly to understand that their proposals represent their last act in an effort to bring about agreement, and that hereafter (if not accepted) the districts would be left to settle matters on their own account (which is the course that should have been adopted months ago), the conference of delegates proceeded to consider a resolution from South Wales—a resolution conceived in fury, and directed to intimidating the nation into pressing for further intervention in a way which would conform to the views of the Federation Executive. This body, it is clear, do not yet understand the nation. What is proposed is either a piece of bluff or further madness, with a view to saving the Federation from an absolute defeat of the policy with which they started the great struggle. The resolution suggests the wholesale withdrawal of safety men, an embargo on foreign coal, the stoppage of outcropping, a Trade Union levy propaganda in the "black" areas, and the nation-wide campaign by Labour Members of Parliament; also central control of the operations to be vested in the Miners' Executive—thus superseding local bodies where necessary. This resolution was carried by the delegates by 594,000 votes against 194,000. The withdrawal of the safety men (to which proposal not a few of the leaders are strongly opposed, including the President, Mr. Herbert Smith) is the most important of the items in the resolution. It is a pitiful scheme by men of unbalanced judgment, struggling with what they realize is a lost cause.

Perhaps too much stress need not be laid upon the proposal, inasmuch as it is not likely that it will prove effective. In the first place, the miners themselves know that the withdrawal of the safety men would be most disastrous to their employment for long to come; and we are strongly of opinion that a large majority of them will not show any enthusiasm over this fresh piece of madness on the part of their leaders. If there could be effective withdrawal, it would not only prolong the stoppage, but would render totally unfit for further use many of the pits in which men now find employment. Furthermore, the Miners' Federation do not control more than a small percentage of the safety men. The others are members of the National Federation of Colliery Engine Men, Boiler Men, and Mechanics, who are not in favour of such reckless policy. It is not certain that even the few safety men who are associated with the Miners' Federation would be willing to respond to an order which they know would be destructive of their own interests, and those of the men who work with them. Moreover, it would be impossible for the Government to stand by and see the consummation of this decision without taking immediate steps to prevent injury to the interests of the country, which is its objective. As a matter of fact, the Home Secretary, as recently as Aug. 30, stated that, should any such course be adopted, it would be his duty, as well as that of the Government, to protect the national interests.

Second thoughts are sometimes best. A night's sleep after Thursday's decision somewhat cooled down the ardour of the delegates for a destructive policy. They remembered that, in the heat of the day before, they had forgotten they had no mandate from the districts to order the withdrawal of the safety men; and they also probably recollected that there is another Federation controlling the greater proportion of these workers, and that this body is altogether out of sympathy with the strange mentality and inglorious record of the Miners' Federation. So another resolution was passed—that the matter of the withdrawal of the safety men should be referred to the districts, the results to be ready for another delegates' conference to-morrow. This means the country is to witness another great farce over taking a vote of the miners. Though the struggle has been such a serious matter, these incidents in procedure are truly humorous, and are excellent certificates of the quality of statesmanship in the Miners' Executive. Mr. Robert Shirkie, the Secretary of the Federation to which the bulk of the safety men belong, has intimated that it will make little difference how the voting goes, as their men will not leave work at the command of the Miners' Federation. It is plain enough, in such circumstances, why Mr. Cook, in a public speech, says that his Executive are not out to flood the mines. If this is so, then they do not know what they are out for. The resolution they passed on Thursday, if it means anything at all, is a threat—having lost in the struggle for impossible conditions, and with shattered forces in the field—to do something to damage the industry still further. Their acrobatic performances have another illustration, in that they have re-established the slogan—"Not a penny off the pay; not a minute on the day," with a national agreement to boot. The fact is they are annoyed with the whole world, except Soviet Russia. The mission to America to seek funds returned with less than 5 p.ct. of the hoped-for harvest; the trade unions of this country will not, and cannot, help them; the International Miners' Federation will do nothing effective; Britishers generally are unsympathetic. The Miners' Federation Executive cannot muster up brains enough to investigate why their policy is repugnant to the whole world, except their Soviet friends, or why it is that judgment goes against them everywhere they turn.

There is no other point in last week's proceedings connected with the stoppage to which reference need be made, with one exception. There is general regret that the Archbishop of Canterbury should have seen fit again to essay intervention by a speech well-intentioned, but an influence for more harm than good. His Grace does not possess any knowledge which enables him to suggest anything technically practicable in connection with the dispute. The only way in which he could to advantage interest himself would be to try to infuse in the Federation Executive a better understanding of the essentials of the coal industry, and more goodwill to the country. This would, indeed, be beneficent work. As, however, the Executive of the Miners' Federation appear to be impervious to good counsel, His Grace might perhaps do better by advising the miners to go back to work, and

make the best terms possible on their own behalf with their employers in each district. Those men who have returned to the pits have found that the terms are, by giving a fair day's work, highly beneficial to them.

There was an almost dramatic turn in events during the week-end. In Leicestershire, the Miners' Council decided to call off the strike, and to instruct all miners in the county to report themselves for work. Nottinghamshire, it is anticipated, will at once follow suit. It is also reported that Yorkshire and Scotland are feeling the reality of the return to work. Throughout the mining areas, there is a growing realization that the Miners' Federation have sacrificed their power and prestige, and that the central edifice is in a precarious condition. Regarding Nottinghamshire and Derbyshire, one of the Directors of the Bolsover Colliery Company informed the men that all the owners are prepared to enter into agreements for five or seven years on present terms, which is an answer to those agitators who have tried to influence men from returning to work by stating that, when once they are safely at work again, the owners will press for a reduction of the terms. Perhaps the most astonishing pronouncement came from Mr. Cook, who said that he had never recommended the flooding of the pits; that he had opposed the policy in the past, and, as a leader, he gave his advice against it at the delegates' conference. One labour correspondent states that Mr. Cook has spoken both ways on the subject. It should be said that the President (Mr. Herbert Smith) lamented the calling-out of the safety men when that step was taken in 1921.

Value of Vertical Retort Supervision.

There are many excellent points in the Presidential Address which Mr. W. H. Battersby, of Bury, delivered to the Manchester District Junior Gas Association last Saturday. But one matter with which he dealt stands above all others. It is the value of thorough supervision and control of the operations of continuous vertical retorts; and he proves beyond challenge that this pays in results—not only productive, but life and maintenance. If by such means one can realize higher yields, and at the same time prolong the life of the retorts, and reduce maintenance charges per ton of coal carbonized, the triple effects combine sensibly to lower the cost per unit of production. The argument, of course, applies to any system of carbonization, but to continuous vertical-retort working more than any other. With that system supervision and control are important factors in operation; and this is proved by Mr. Battersby, through his experience at the Bury Corporation Gas-Works, where his chief (Mr. H. Simmonds) rightly insists that it is attention to detail which produces efficiency and the ultimate economy.

Among the new dicta of the gas profession is this—that thermal production per ton of coal carbonized is not more important than thermal production per retort per day, which has relation to throughput. The two things require to be studied together; and this is done at Bury, in connection with the forty Glover-West vertical retorts. From the commencement of the working of this plant, Mr. Battersby says: "Our policy has been maximum output "per retort to secure the greatest possible gas production "from the installation;" but this is only accomplished by efficient supervision and control being given to the physical, chemical, and mechanical operations involved. The address tells those who are interested how everything from the coal onwards is dealt with; and this systematic working discloses at once any alteration of conditions which may necessitate change in procedure—whether in temperatures, rate of coke extraction, or otherwise. Methodical operation in keeping the settings well "tuned-up" in every part is highly essential, and scrupulous attention is paid to scurfing in conformity with the lines explained in the address. Just a few words on this point. Mr. Battersby is very much in favour of a system of scurfing based on general working behaviour, rather than carrying out the operation according to plan on a fixed time-table, as, by the former method (built up on practical observations), a much longer period of working can be secured. One rule is that, during scurfing, a retort must not become any hotter or colder than during working. It is possible that more damage is done to retorts through careless scurfing than through any other cause.

We will not dwell here on the methods of control and supervision. After all, they are of the simplest kind, and highly effective where there are brains and conscientious observance behind them. The main point is the proof that they pay, regarded from the basis of production either per ton or per retort per day. To both, attention is given at Bury. All sorts of coal are used—Lancashire and Yorkshire—in the shape of nuts, peas, beans, and slacks. The average daily throughput is 2·88 tons per retort, against a nominal 2·75 tons. Readily 50,000 c.ft. of 475 B.Th.U. gas (237·5 therms) per retort is obtained, giving a certain production when all the retorts are in operation of 2 million c.ft. per day, against a nominal capacity of 1½ millions. In a four days' test, 3·16 tons were carbonized per retort per day; the gas made per ton being 17,510 c.ft., and per retort per day 55,343 c.ft., of 456 B.Th.U., or 252·3 therms per retort. These figures show that, though the retorts were designed to produce approximately 40,000 c.ft. apiece per day, Bury has been able, by systematic treatment, to increase this to 50,000 c.ft., and on occasion to 55,000 c.ft. The figures show that between their guarantee and the actual realizable, the makers have left a good margin to cover inferior coal and lax supervision and control.

That is one result of supervision and control; the other is that they are also factors in the life of retorts, and therefore in capital and maintenance costs. Mr. Battersby gives information as to the life of the Bury retorts, work already accomplished by them, and their prospects in both respects. Take the eight retorts in setting "B." On Oct. 1 this year, they had passed through 1474 working days. By next spring another 200 days will have been registered—making 1674. Calculating 2·85 tons per day, less 3½ p.ct. for scurfing, we have 4605 tons of coal carbonized per retort. The whole cost of maintenance, with complete re-setting next year of "B" setting, is estimated at £1100, which means that the total cost of maintenance will average 5·72d. per ton of coal carbonized.

These figures will be carefully scrutinized, and many comparisons will be made elsewhere. Where there is not equality, subject to the characteristics of the coal used, there will be an examination to ascertain whether supervision and control are on the same plane as sketched in the address. The information is not presented to exalt Bury, but as testimony to the value in continuous vertical retort working of systematic supervision and control.

Restoring the Level of a Gasholder.

An attractive title was given by Mr. J. Stephenson, the Engineer of the Ferndale Gas Company, to the paper which he read at the meeting of the Wales and Monmouthshire Institution of Gas Engineers and Managers, on Tuesday of last week. It was "A Plain Tale from the Hills: An Uplifting Story;" and full justification for it was found in the communication. It was not only a plainly told tale, but it was a most interesting and instructive account of a truly excellent engineering feat. It is not a new comment that gas engineers operating in colliery areas which are liable to subsidences—even those in charge of small undertakings—have trials and difficulties which continually keep them on edge, and which are not met with in a concern, large or small, in a district where there are no subterranean workings. They never know what to expect, or when and which part of their plant will next be claiming, through mishap, their serious attention. They are continually fighting unaccounted-for gas; and, in short, it seems to us, from conversations on the subject of their experiences, that they are never surprised at what occurs, and take it all philosophically as coming within the day's work.

Mr. Stephenson's paper in the main was devoted to an account of a holder which sunk and got out of level to such an extent that, the period being against the construction of a supplementary holder, the supply of gas had to be shut-off from the district for nine days while the holder was emptied and levelled, which is not a light piece of

work, even for a two-lift structure in steel tank, only 62 ft. diameter and 18 ft. deep, with a reinforced concrete raft foundation. The holder had been gradually getting out of level; and there had been careful watching and measurements to safeguard the gas supply until the time came when the work of levelling could be undertaken. But a slight earthquake shock was sufficient to change contemplated action into immediate performance. The complete cessation of the supply of gas, while the work was being accomplished, is an aspect of the matter which alone would cause no little uneasiness to most engineers. Probably it did to Mr. Stephenson; but he makes no great point of it. When need drives in such a matter—well, then there is nothing more to be done. When there is only Hobson's choice, there is nothing to discuss. All that can be done is to accept the situation, and do what is required. The plans that were adopted in this instance were ingenious; and, so far, we gather they have proved most effective. We will not describe them here, as this could not be done more explicitly or succinctly than the presentation of the details by the author of the paper. The whole job was well organized, and every item was carried through according to programme, and to the prearranged time-table. Nothing was left to chance in the plan of campaign; and nine days saw the consummation of the task. We heartily congratulate Mr. Stephenson and all who had part in the successful "uplifting" scheme. The paper reminds us of the contribution on "Experiences with Gasholder Tanks in a Mining Area" which Mr. Chas. Dru Drury read before the North of England Gas Managers' Association last year (see "Journal," May 6, 1925), and which also contained much valuable information.

There is one wrinkle in Mr. Stephenson's paper which it may be useful to engineers in other colliery districts to note. It is what he terms an anti-leak clip, which is a device patented by one of his predecessors at Ferndale. The clip is attached to the socket on the main; and it holds an indiarubber band tight against the joint. The effectiveness is proved by the fact that on many occasions the clips and bands have been removed; and it has been found that joints were leaking, though, before the removal of the bands, there was no escape. Such good experience should commend the arrangement to engineers in other colliery areas.

Training Gas Men in New York.

Mr. Geo. B. Cortelyou, President of the Consolidated Gas Company of New York, announces a new plan for the training of graduate engineers to become gas service men and salesmen. A dozen graduates, representing half-a-dozen scattered engineering colleges and universities, have been accepted by the Company to undergo a rigorous course of training in gas manufacture and laboratory work. Half of the group will be given practical training in all phases of gas plant operations. They will fire retorts, engage as pipe-fitters, and, during their training, perform every operation which goes into the production of gas. The other half will be given a course of training in the Company's Utilization Testing Laboratory. Says Mr. Cortelyou: "This course has been adopted by the Company as a means of still further raising the standard of our service to the people of New York. It is hoped that it will also have the effect of encouraging technical students throughout the country to avail themselves of the many opportunities now offered by the gas industry. . . . The response from engineering schools has been most encouraging, and made the selection of candidates a difficult task. These include men from Stevens Institute of Technology, George Washington University, Lehigh University, Sheffield Scientific School of Yale, California Institute of Technology, and the University of Virginia. As a consequence, the Company will make the training course a permanent part of their organization."

Sic Transit Gloria Mundi.

In a note in the "Birmingham Despatch," it is mentioned that the house in which Murdoch lived in Cross Street, Redruth, has been offered for sale by auction without attracting a single bid. The writer of the note declares that "it is safe to say that it was the first house in this country in which gas lighting was installed." In his view, it is a pity that "a residence so full of history and romance should be allowed to crumble into ruins without an effort being made to preserve it either for the town itself or the nation. Some years ago Murdoch House was considerably damaged by fire; and since that time it has not been occupied. No repairs have been done; and the property is fast falling into decay."

Maintenance and Reputation.

When the manufacturer of any gas-using appliance sells one of his products, his direct connection with it ceases. It is no longer his property; and he does not sell the agent which his cooker, fire, water-heater, furnace, &c., requires for its service. But it is important to him that the appliance, whatever its character, should be used with the utmost efficiency; as to him a high reputation is a good business asset, though more so to the gas supplier. In our view, the greater interest that is being taken in free maintenance in the gas industry will cause the manufacturers of gas appliances to keep a watchful eye on both the design and efficiency of their productions, so that they will readily accommodate themselves to economical maintenance, and at the same time render the highest attainable efficiency when in good order, and adjusted to the local gas-supply conditions. Mr. Cyril G. Davis has written to us a letter on the subject—not for publication, but without any embargo on a reference to it. He has been studying Mr. John W. McLusky's paper on the free maintenance scheme in Glasgow; and he indicates that he is confident from a full business life's connection with these matters, that, where there is the want of some such method of inspection and maintenance, gas appliances do not universally give that standard of efficiency and economy to the consumer of which they are capable. There is all the difference in the world between a gas appliance left permanently to the tender mercies of the layman, and one which has periodical attention from the expert hand. Another point Mr. Davis makes is that everybody engaged in the work of the gas industry should make a study of the benefits of maintenance, and its effects upon progress.

Advice to the Selling Staff.

So impressed is Mr. Davis by this, that he has urged all the members of the selling staff of the Davis Gas Stove Company (Radiation, Ltd.) to study the subject. In doing so, among the points he makes is this: "With a maintenance scheme, the usefulness of the apparatus is enhanced; and consequently it gives more satisfaction to the consumer. There must be many cases where electric stoves have been installed solely on account of people's unpleasant experiences with faulty gas apparatus. Again, apart from the fact that electric cooking is much more expensive than gas, there is no doubt that the maintenance of electric cookers is also very high. If the gas undertakings of the country were generally to adopt free maintenance, it would put gas for cooking and heating yet another street ahead of electricity. Also, if the maintenance man knows his job, having secured the confidence of the consumer, how easy it is for him to recommend other classes of gas apparatus than those to which he is already attending." That has been the experience of Glasgow.

Control of the Individual at Woolwich.

There are two items of news from Woolwich, one of which is satisfactory; the other is not. It is stated that a new tariff for the supply of electricity for domestic purposes is about to come into operation, and that the rental of full range cookers is to be reduced from 15s. to 7s. 6d. We do not gather that this refers to the residents on the Eltham Housing Estate, whose grievances over the denial of the right to use gas, at the instance of the socialistically dominated Council, have been the subject of criticism, controversy, and hooliganism, as described in our columns. However; those householders who are privileged to come under the new tariff (which appears to be a two-part one) will be gratified to learn from the Chairman of the Electricity Committee that there will be no compulsion to take only electricity, and not gas. Regarding the second matter, the Council are going to exercise something

in the nature of compulsion upon their employees to become members of trade unions. Notices are to be posted at all depôts to the effect that, in the opinion of the Council, all employees should be members of a trade union; that the attention of new employees should be officially drawn to these notices when they are appointed; that shop stewards be informed when new employees are appointed; and that time be granted to shop stewards to interview men employed on outside works. The result of this is obvious; life for a Woolwich Council employee will not be worth living unless he is a member of a trade union. We hope that none of the tenants on the Eltham Estate are employees of the Council—to be compelled not to use gas, and to be obliged to be a member of a trade union, would be enough to knock out of them all feeling of personal freedom. Woolwich will soon become a place to be avoided; certainly its local governing body will become the laughing-stock of contemporary authorities who decline to interfere with the liberties of their constituents.

PERSONAL.

Mr. J. GRAYSTONE, of Colne, has been appointed Assistant Gas Manager at Hinckley.

The Stafford Town Council have appointed Mr. LESLIE WILSON, of Doxey, Chemist and Technical Assistant.

Mr. R. G. ROGERS, Superintendent of the Fittings Department of the Birmingham Corporation, has been seriously ill. His many friends will be glad to learn that he is now making satisfactory progress.

Mr. HOWARD WISE, the Gas Engineer at Droitwich, has resigned, having accepted a similar position with the Sherborne (Dorset) Gas and Coke Company. At a special meeting of the Droitwich Lighting Committee, Alderman Holyoake said that they had always found Mr. Wise a most efficient servant, always courteous and obliging to every one. Alderman Gabb and Mr. E. Evans remarked that his resignation would mean a loss to the town.

OBITUARY.

Mr. STEPHEN TAYLOR, Chief Cashier of the Accountancy Department of the Hastings and St. Leonards Gas Company, died suddenly while selecting a book at Messrs. Goulden's shop at White Rock on Thursday, Sept. 30. Mr. Taylor had left his duties as usual at 5.30 p.m., and about an hour later entered the library. He was about to select a book, when he was taken ill, and collapsed. He died almost immediately. He was 76 years of age. An old and valued servant, Mr. Taylor had spent a lifetime on the clerical staff of the Gas Company. He entered the office at the age of 14, and climbed the ladder until he held the chief position on the clerical side of the Company's activities. He leaves a widow, three daughters, and one son.

The death has occurred of Mr. SYDNEY RUSSELL BARRETT, for thirty years Fittings Superintendent of the City of Birmingham Gas Department, aged 70. He retired in June, 1918. Mr. Barrett was a civil engineer, and in early life was an assistant engineer for the erection of Government bridges in South Africa. Later he was associated with firms which supplied gasholders and other heavy plant. In June, 1888, he was appointed Fittings Superintendent to the Birmingham Gas Department. During his service in Birmingham, the number of gasfitters and boys increased from 36 to 300, and the number of gas engines in use grew from 100 to approximately 3000. He did much to popularize the prepayment meter; and when he retired there were 100,000 such meters in Birmingham. Successful pioneer work was carried out by Mr. Barrett in the application of high-pressure gas for industrial purposes. There was a large attendance at the funeral, on Friday, at Brandwood End, Birmingham.

It is with much regret that we have to record the death of the wife of Mr. G. A. MALLETT, Secretary of the Ipswich Gas Company. Mrs. Mallett was taken suddenly ill in chapel on Sunday morning, Sept. 26, and her condition rapidly became worse, necessitating her removal to a nursing home, where an operation was successfully performed. For a few days she appeared to be making a recovery; but then, in spite of every attention, she sank slowly, and passed away on Friday, Oct. 8. Mrs. Mallett leaves a large circle of friends, by whom she was much esteemed, and who will sympathize with Mr. Mallett and his son and daughter in their bereavement.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Oct. 16.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting in the Heriot Watt College, Edinburgh, at 3 o'clock. Address by Dr. C. B. Marson on "The Influence of Ash Constituents on the Carbonization and Gasification of Coal."

Oct. 20.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, at 2.30.

Oct. 20.—INSTITUTION OF FUEL ECONOMY ENGINEERS.—Luncheon at the Connaught Rooms, W.C. 2, at 1 o'clock. Address by the Rt. Hon. Sir Robert Horne, P.C., M.P. Sir Hugo Hirst, Bart., Vice-President, will be in the chair.

Oct. 21.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting at Birmingham.

Oct. 21.—MURDOCH LODGE No. 3480.—Meeting.

Oct. 23.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to the Granton Gas-Works, Edinburgh.

Oct. 25, 26, 27.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual conference at Newcastle-upon-Tyne.

Oct. 29.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Presidential Address by Mr. A. Broadbent.

Nov. 3.—INSTITUTION OF CHEMICAL ENGINEERS.—Annual presidential reception at the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, S.W. 1, at 8.30.

Nov. 6.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Meeting at the Royal Technical College, Glasgow.

Nov. 9.—NATIONAL GAS COUNCIL.—Meeting.

Nov. 9.—FEDERATION OF GAS EMPLOYERS.—Meeting.

Nov. 11.—SOCIETY OF BRITISH GAS INDUSTRIES.—Autumn general meeting at the Hotel Cecil, under the presidency of Viscount Ednam, M.C.

Nov. 12.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Meeting at the Hotel Cecil.

Dec. 7-8.—INSTITUTION OF FUEL TECHNOLOGY.—Meeting.

Feb. 16.—"B.C.G.A." MIDLAND DISTRICT CONFERENCE.

INSTITUTION OF GAS ENGINEERS.

Nov. 8.—Emergency Committee, Finance Committee.

Nov. 9.—Advisory Committee on Education.

ELECTRICITY SUPPLY MEMORANDA.

The Campaign and the Coal Strike.

In connection with the "Wiring of the Homes Campaign," there have been meetings in different centres for the mobilization of the electric forces; and it is stated that the enthusiasm is great. The coal strike, so it is averred, has helped the movement considerably. But it is hardly fair to credit to the campaign the credit due to the coal strike. This must be remembered when the campaign achievements of the winter come to be considered. Through the coal strike, it is reported, electric heating apparatus is being installed with "feverish anxiety" in all towns in anticipation of the cold and frosty days ahead. This may not continue after the strike. Assurance is given that the electricity industry thinks that the national effort could not have come at a more opportune time. So long as there is scarcity of coal, we doubt it. If coal is not plentiful, and the capacity of the generating plant is already fully loaded at parts of the day, the new business will not be warmly welcomed. Heating is not discontinued with the setting of the sun; it is carried on through the peak hours of lighting, which is not electrically good. In those circumstances, the "feverish anxiety" will not be confined to the people who want electric fires; it will spread to the officers responsible for meeting the demands for electrical energy. In the gas industry there is no "feverish anxiety," despite the fact that the universal report is that bookings for gas fires and other gas-heated appliances are so great that the fitting staffs cannot cope with them. The orders are being executed with as great rapidity as possible; and still they come. Simultaneously, with the campaign, the "Electrical Review" is offering for sale, "at a comparatively nominal charge," a small pamphlet entitled "Suggestions for Dealing with Apparent Death from Electric Shock."

Pulling Together.

The "Electrical Review" has been referring to what was said at the annual meeting of the Institution of Gas Engineers—notably at the luncheon—regarding the investigation by the Joint Committee of the Institution of Electrical En-

gineers and the National Gas Council, to ascertain whether there cannot be closer co-operation in promoting capital and fuel economy in the supply of energy derived from coal and other fuels. So far as the co-operative production of gas and electricity is concerned, our contemporary is favourable to the movement. But it states that "these overtures on the part of the gas industry are distinctly interesting." Mr. C. P. Sparks, at the Institution luncheon, stated that "the Institution of Electrical Engineers talked over the matter seriously last year, and determined to approach the gas industry, and see if some 'clearing house' could not be set up." Mr. Sparks ought to know what happened in the way of overtures; and his remark does not coincide with that of the "Review." One reason why these overtures are distinctly interesting to our contemporary is that "they largely coincide with the inauguration of the most intensive propaganda ever undertaken on behalf of domestic electricity supply." Apparently it is suffering from some confusion of thought, inasmuch as, only a few lines earlier, it states that some months ago it expressed the view that, in both industries, there would be "unalloyed satisfaction that at long last a final move has been made towards greater unity." Thus the origin of the movement does not synchronize with the campaign. The remainder of our contemporary's article is consistent with the views of many men in the gas industry, seeing that there is admission that "co-operative production of gas and electricity, combined with the recovery of the valuable bye-products of coal, offers the best prospects of making the utmost use of our natural resources, and doubtless will eventually come into vogue." But evidently it thinks it should all end there. In its view it appears most desirable that the spirit of friendly competition which has hitherto prevailed at the distribution end of the business should be maintained and upheld. We agree; but our contemporary should take a wider look over the field for other points of contact at which there can be co-operation. For some time past on questions referring to legislation, the use of the sub-soil of roads, the additional burdens that railway and local authorities would impose upon public utility undertakings in connection with road openings, diversions, and other matters, it has been found that united action can be taken with more mutual good resulting than can be obtained by divided action. We need not here discuss our contemporary's view, that the domestic consumers' interests are on the side of the extended use of electricity in the home; and we do not in any way blame it for registering its resolve to continue to support with the utmost enthusiasm the campaign for the "Wiring of Britain's Homes." It could do nothing else, without affecting its stability in the industry.

Thermal Storage. For years electrical enthusiasts have been dabbling in the electrical storage of heat; but in this country, where gas is practically universally available, the retrograde movement in convenience has no great attraction—other than to electrical engineers. They view the matter from the point of view of the load factor; the consumers from the dual one of the cost of installation and the set-back in convenience as compared with gas operation or the economical and always ready-to-serve coke-boiler. The heating of water during night time, by allowing electric energy to trickle into an element immersed in water in a tank, with heat escaping therefrom during the long cold night hours of winter, is described by the "Electrical Review" as being a useful method when carried out on scientifically correct lines, and it declares that it is more efficient than might appear probable. Its usefulness is confined to the electricity station; but the revenue from it (say, as in Glasgow, ⅜d. per KW.H.) is not of an order that will fatten the revenue account. As to its thermal efficiency, heavy lagging of the container is necessary if the loss of heat is to be kept within reasonable bounds; but heavy lagging is expensive and ugly. At a low price for energy, the "Review" is of opinion that it may be proved economically sound to waste a "little" heat rather than to spend more money on lagging. The "little" is not defined; and our contemporary is persuaded that a high degree of efficiency is not essential to success. At ⅜d. per KW.H., it is said, electricity can compete successfully with other sources of heat. Is the "Review" sure of that? We hope it will not regard it as an impertinence if we differ. Without going on the present occasion into the claims of gas (excepting to say in passing that the current orders for gas geysers and circulating boilers have carried the curve of demand up in a very striking fashion), we would suggest that the popular coke-boilers would, in respect of economy and prompt availability, knock into a cocked hat the fantastic method of water heating by night dribblets of electricity. Fancy having to heat (say) 80 gallons of water by this method, so that in an ordinary household three or four people can successively have baths before breakfast in the morning! Just imagine the size of installation that would be required; and think of the "little" heat that would be lost with the water standing (in mid-winter) for perhaps ten hours in a tank on which, through the "cheapness" of the current, money has not been squandered on lagging! If we continue to think of these points, our sides will ache with laughing. There are not many households who will look with favour upon going backwards in domestic efficiency.

Coal Consumption and Lighting. The electricity supply industry appears to be concerned over the prohibition of all unnecessary lighting during the period of high pressure for coal supplies in the country, with winter approaching. It thinks too much is being made of this. Such aphorisms as "Every little helps" do not appeal. The cumulative effect of small economies is scorned by the electricians in their anxiety to get as much revenue as possible from the high-priced lighting units. The "Electrical Times" considers it "important" to lay some emphasis on the remarkably small proportion of the country's coal consumption due to electric light. "Electric lighting," it says, "is an extremely expensive service to cater for, it generally comes on peak, but its total absorption of coal is not its striking characteristic." Agreeing with this, we would suggest that the authorities should look to the waste of coal arising from the generation of energy at the low efficiency of anything between 6 and 18 p.ct., from which (say) a 15 p.ct. loss of units in distribution has to be deducted; and then—particularly on the hotplates of cookers and for water heating—there are further losses in utilization. However, the "Electrical Times" quotes figures from the "Colliery Year Book" as to the distribution of coal consumption in this country in 1924. This states that the coal used in gas-works was 16·20 million tons, and in electricity stations 7·50 million tons. The 16·20 million tons for gas-works is incorrect, inasmuch as the statutory undertakings alone (see Board of Trade returns) used 17·32 million tons that year. Our contemporary apparently objects to the economists concentrating on electric lighting, because this is the electrical service most visible to the public eye. It asks what is the relative absorption of coal, and finds it impossible, in seeking a reply, to do more than indulge in guesswork. It says: Public electric lighting represents an extremely small fraction of the whole. If we turn to shops and private houses, we find that electric lighting is not separable from heating, cooking, fans, and small motors. It has been stated, however, by the Electricity Commissioners that the units generated in the whole Kingdom were used thus in the year 1922-23:

	P.Ct.
(*a*) For power purposes	65·9
(*b*) For lighting and domestic use	18·3
(*c*) Unaccounted-for	15·8
	100·0

It would be incorrect to state that lighting therefore corresponds to 18·3 p.ct. of 4·16 p.ct. of the country's coal consumption. In the first place lighting does not amount to 18·3 p.ct.; this percentage being swelled by many other domestic uses. In the second place, lighting is not always turned out at the same efficiency as the power load. "We shall be safe, however, in assuming that electric lighting accounts for appreciably less than 1 p.ct. of the country's coal consumption." Seeing that the country's coal consumption in 1924 is stated to have been 180·4 million tons, 1 p.ct. is not a negligible figure.

In Freakish Mood. It is interesting to watch the freakish ways of electricity. A few more samples are to hand. Mr. W. J. Liberty had finished a lecture in the Geological Reading Room, Burlington House, last Monday week, and a discussion was about to open, when the lights went out. The subject had been artificial lighting; and evidently there was some latent disagreement with the lecturer on the part of the electric lights. The generation of heat—justified or otherwise is not known—that ensued caused a fuse to go on the main switchboard; and the remedy could not be applied for some time. The accidental fall of a fireman's poker from an engine on the Southern Railway line to Kingston the same night upset the traffic. The implement dropped on to a live rail, there was a short circuit, and the rail became unpleasantly contorted. A fireman on an engine at East Croydon Station was electrocuted on Tuesday last week. He mounted the engine bunker to break coal; and it is supposed the head of his hammer touched a live wire of the overhead electrical equipment. "Lest we forget" that electricity can cause fires on trains, it may be mentioned that, on Tuesday afternoon last week, it was found that one of the coaches on a Metropolitan train was on fire, through some mishap which the electrical equipment under the coach and the live rail collaborated in bringing about. The train was promptly brought to a standstill; and steps were taken to ensure the safety of the passengers. At a recent conference at Margate of officers of fire brigades, Mr. J. W. Dane, of the Croydon Fire Brigade, stated that in 1924 electricity figured third in the list of causes of fires in London, and second in Paris. He also asserted that the electric iron had been one of the worst agents in producing fires. In one instance of which he knew, airing bedding by an electric heater had caused an outbreak. While putting decorations on a lamp standard in Manchester recently, George Smith (according to a report) "sprang into the air and, falling, was killed." At the inquest, it was stated that he was not wearing rubber gloves.

NEW VERTICALS AT GRANTON.

A Royal Inauguration.

Their Royal Highnesses, the Duke and Duchess of York, who are by no means strangers to Edinburgh, had an interesting series of engagements in the Capital of Scotland last Saturday. The chief object of the visit was the fulfilment of a previous arrangement that His Royal Highness should receive the freedom of the city—an honour which had previously been conferred upon his elder brother the Prince of Wales, and his younger brother Prince Henry. The Edinburgh Corporation also took the opportunity of the Royal Visit for the inauguration of the new vertical retorts at the Granton Gas-Works, which have been installed at a cost of £250,000.

Motoring into the city on Saturday forenoon, Their Royal Highnesses first visited the Royal Infirmary, for the opening of the new Radiological Department. The freedom ceremony followed at noon, in the Usher Hall; Lord Provost Sir William L. Sleigh presiding. From the Usher Hall, the Royal and municipal party proceeded to the Assembly Rooms in George Street, where luncheon was served to a company of about 250. Later in the afternoon the ceremony at Granton Gas-Works was carried through, the Duke inaugurating the new installation, and the Duchess unveiling a commemorative tablet.

CEREMONY AT GRANTON.

Fully 1400 seats had been provided in the open—in front of the retort house—for the convenience of invited guests and spectators. The arrival of the Royal party was heralded by echoing cheers in the distance, and the large and enthusiastic company continued the demonstration of loyal greetings as the Duke and Duchess appeared, accompanied by the Lord Provost. The Gas Department's buildings at Granton were gaily decorated, and there was a tasteful display of bunting all round the enclosure. The National Anthem having been played, the Royal visitors and party were conducted to the front of No. 2 exhauster house, where the inauguration ceremony was performed. Prayer was offered by the Very Rev. C. L. Warr, St. Giles' Cathedral, Edinburgh, Dean of the Thistle.

Lord Provost SLEIGH, in the course of his introductory remarks, said it was a great gratification to the Corporation of Edinburgh that Their Royal Highnesses had agreed to take part in the ceremony. The completion of the system at Granton marked the culminating point of a great municipal enterprise. The provision of lighting and heating facilities was a very material factor in the life of the community, and the Corporation of Edinburgh had devoted a great deal of time and attention to this important matter. It was in 1816 that the Edinburgh Gas Light Company was established, and two years later the first distribution of gas took place. In 1823 another Company was formed, called the Edinburgh and Leith Gas Light Company, and both companies continued operations until 1888, when the Edinburgh and Leith Corporations Gas Commissioners were incorporated to carry on the undertakings on behalf of the two communities. Under the Extension Act of 1920, the Gas Commission were dissolved, and their functions transferred to the Edinburgh Corporation. As showing the growth of the undertaking, it was sufficient to say that the total revenue last year was nearly £600,000, and the working expenditure just over £500,000—the difference representing interest and sinking fund charges. In 1890 the total production of gas was over 1273 million c.ft., while it had now reached 2947 million c.ft., representing an increase of over 130 p.ct. Owing to the growing demand for gas for all purposes, the Town Council in 1924 approved of a scheme for the introduction of vertical retorts, along with the necessary motive power and mechanical plant. In addition, larger and more efficient exhausters, condensers, washers, scrubbers, and tar extracting plant had been installed. The combined schemes had involved an outlay of roughly £250,000. The incidence of the considerable outlay would fall lightly on the consumer. Indeed, as a result of careful administration and the general success which had attended the operations since the transfer to the Edinburgh Corporation about six years ago, it was anticipated that the added capital burden would not increase the outstanding debt beyond what it was at the time of amalgamation. The Gas Committee of the Corporation, under the able Convenership of Councillor James Stewart, and the Vice-Convener, Councillor Gregorson, along with the Engineer and Manager, Mr. H. H. Gracie, had been most diligent in their efforts to promote the efficiency of the undertaking; and its successful expansion and growth was due in large measure to their constant zeal and activity.

The Lord Provost thereafter presented the Duke with a gold key, and asked him formally to inaugurate the new retorts.

HIS ROYAL HIGHNESS said: It is a great pleasure to the Duchess and myself to be here to-day, and to have this opportunity of inspecting the new process of gas manufacture. I thank the Lord Provost for the most interesting information which he has given to us; and it is quite obvious that the people of Edinburgh have reason to be proud of their Corporation Gas-Works. Among all the statistics which have just been given to us, the fact stands out that your output of gas, as indicated by the Lord Provost, is practically one-eighth of the total output of all Scotland. Clearly, the Edinburgh Corporation are prominent among the leaders of the great gas industry in maintaining their works in the highest state of

THEIR ROYAL HIGHNESSES ON THE WORKS.

efficiency. This, possibly, is only what might be expected, in view of the fact that it was a Scotsman, Murdoch, who commenced the gas industry in 1792, when he first lighted his house at Redruth with coal gas. It would appear, therefore, to be no more a novelty for a Scotsman to be a leader in this industry than it is for a Scotsman to confer the benefits of his enterprise on the more southern parts of this island. [Laughter.] In our densely populated and industrial areas, the use of gas for domestic purposes will go a long way towards freeing these districts from soot and smoke, and will thereby be of the greatest benefit to the health and welfare of the people. The great developments in the gas industry of which the Corporation's new advances are an example will do much towards clearing the atmosphere of your city and allowing more sunlight to reach its citizens. Ladies and gentlemen, it gives me the greatest pleasure to declare this new installation open. [Applause.]

His Royal Highness then pressed a switch, which set the machinery in motion.

COMMEMORATIVE TABLET UNVEILED.

On the invitation of the Lord Provost, the Duchess of York unveiled a commemorative tablet, and was presented with a

THE TABLET UNVEILED.

bouquet by Miss May Sleigh. The tablet bears the following inscription:

Edinburgh Corporation Gas Undertaking,
Granton Works.

This tablet to commemorate the inauguration by His Royal Highness Albert, Duke of York, K.G., K.T., of the new vertical retort plant and machinery was unveiled by Her Royal Highness, the Duchess of York, on Oct. 9, 1926. The Right Hon. Sir William Lowrie Sleigh, LL.D., Lord Provost of the City of Edinburgh.

Then appear the names of the members of the Gas Committee, with Councillor James Stewart, Convener, Mr. A. Grierson, Town Clerk, and Mr. H. H. Gracie, Engineer and Manager.

Councillor James Stewart said that he had for a long time been closely associated with the administration of the city's gas undertaking; and he rejoiced in the success it had attained under the management of their esteemed Engineer, Mr. Gracie, and his staff. [Applause.] They had been able to give good service to the citizens, especially during recent months. Personally, he looked forward with every confidence to the future. He concluded by thanking their Royal guests for their presence, and, addressing the Duchess, asked her gracious acceptance of a silver bowl as a souvenir of the occasion.

After the Duchess had expressed her gratification at the gift, the Lord Provost handed a souvenir to the Convener, in recognition of his services in connection with the undertaking.

The Duke having opened the door of the works, the party entered No. 2 exhauster house, where they signed the visitors' book on a specially illuminated page; and their Royal Highnesses were each presented by the Lord Provost with a morocco-bound copy of a brochure describing the gas undertaking. They were then conducted by Mr. Gracie over the retort house, and watched with interest the various sections at work.

The visit to Granton concluded with His Royal Highness inspecting about 200 ex-Service men, all employees of the Gas Department, who were paraded under the command of Lieutenant George Reid.

DESCRIPTION OF THE PLANT.

[From the Illustrated Brochure distributed to the Visitors.]

The inauguration of a new system of manufacturing gas at the Granton Works marks an epoch in the progress of the undertaking which serves the extensive area of the City of Edinburgh and its suburbs with gas. As a lighting agent and also as a heating and power medium, coal gas to-day is a material factor in the daily life and well-being of the community. At this stage, therefore, it appears opportune to sketch briefly the history of the development within the city of this important source of energy.

Historical.

The Edinburgh Gas Light Company was established in 1816. Application for an Act to charter its existence was made in 1817; the Company having previously obtained permission from the Town Council of that time for the opening-up of the streets and the laying of pipes. Gas was first distributed to the citizens in 1818. The works were located on the site of the old gasworks at New Street, which adjoins the Waverley Goods Yard of the London and North Eastern Railway Company; and this site continued to be occupied until the works were demolished in 1906. The site has been recently purchased by the Scottish Motor Traction Company, Ltd.

Opposition soon arose for the Edinburgh Gas Light Company; the Edinburgh and Leith Gas Light Company starting business in 1823. Their original intention was to supply oil gas. This, however, proved to be unprofitable or unsuitable; and power was later obtained to distribute coal gas in competition with the Edinburgh Company.

In 1824 the Edinburgh Oil Gas Company was inaugurated, with Sir Walter Scott, Bart., as Chairman; and one seems to trace the hand of the "Wizard of the North" in the announcement of this third Company, which stated that it was formed to augment the domestic comfort of the inhabitants by supplying the material of a light equally pure, brilliant, and economical. This Company's works were located at Tanfield, near the site of the existing gasholders; but in 1829 the Company was absorbed by the original Edinburgh Gas Light Company.

CLOSE OF
BELSHAZZAR'S FEAST AND JOSHUA.
BY GAS LIGHT.
AT
THE CALTON HALL, WATERLOO PLACE.

THE public is respectfully informed, that the Exhibition, by Gas Light, of these celebrated Pictures *WILL CLOSE* on the evening of Saturday the 29th inst.

Open during the day from 10 till 4 o'clock; in the evening by Gas Light, from 7 till 9.

Admittance One Shilling.

*** The brilliancy of Gas not only shews to great advantage the various and rich assemblage of objects contained in these pictures, but gives them a peculiarly delicate appearance. It sheds a softened radiance over them, and imparts an effect and a beauty somewhat similar to the effect of moonlight on the landscape, when contrasted with the glow of day

The above copy of an advertisement, which appeared in "The Scotsman" of March, 1823, is reproduced with the consent of the Proprietors. It shows the curious way in which gas was presented as a novelty in those times.

A keen rivalry set in between the two remaining Companies, and much energy was expended in canvassing for business. One result of this was that duplicate mains were laid in all the principal thoroughfares, as well as separate service pipes to shops, houses and tenements. In 1866, however, a districting agreement was entered into, dividing up the area between the two Companies.

Acquisition by the Municipalities, and Formation of Gas Commission.

In 1888 both Companies were acquired by the municipalities of Edinburgh and Leith, and the Edinburgh and Leith Gas

Councillor JAMES STEWART, Convener of the Gas Committee.

Commissioners were incorporated by Act of Parliament to carry on the undertakings on behalf of the two communities. The Companies had a total share capital of £350,000, and in addition had issued £20,000 in debentures. They appear to have conducted their operations in a highly profitable manner, paying a steady 10 p.ct. per annum. This was reflected in the price which had to be paid when they were taken over—namely, the capitalized value of nearly £1,000,000.

The Gas Commission consisted of twenty-three members, including the Right Hon. the Lord Provost of Edinburgh, as Chairman, and the Provost of Leith, as Deputy Chairman; fifteen representatives being elected by the City of Edinburgh and six by the Burgh of Leith. All the original Commissioners have passed away. The first Chairman of the Commission was Lord Provost Sir Thomas Clark, Bart., the first Deputy Chairman was Provost Thomas Aitken, and the first Convener of Works, Councillor James Colston.

At the time of transfer in 1888, there were two manufacturing stations, one at New Street, Edinburgh, and the other at Baltic Street, Leith, with an engineer in charge of each. As the business increased, the works were extended to keep pace with the demand; those at Edinburgh being equipped in 1896 with mechanical stokers driven by hydraulic power, coal breaking and elevating machinery, as well as carburetted water gas plant, which was then rapidly coming into favour. This utilized practically all the space available for extensions.

The Portobello Gas Light Company's works and plant were acquired in 1896; this purchase adding another £24,000 to the capital account. These works were then closed down, and a high-pressure main was laid from Edinburgh to Portobello; the supply of gas being maintained by coupling this up to the existing mains with controlling governors. In 1897 the Commissioners decided to have one engineer in charge of the entire undertaking, and Mr. Walter Ralph Herring was appointed. The difficulties of maintaining an adequate supply of gas in face of the increasing demand were soon apparent; and, owing to the congested state of the manufacturing stations, it became necessary to look out for a more suitable site.

Purchase of the Granton Site.

Two available areas received final consideration, one at Craigentinny and the other at Granton; and, after weighing up the relative advantages, the Granton site, on the shores of the Firth of Forth, about three miles from the centre of the city, and extending to 106½ acres, was purchased from His Grace the Duke of Buccleuch for £124,000. The ground at Granton had much to recommend it, being of sufficient size to meet increasing demands for generations to come, having access to two Railway Companies' lines, and direct communication with Granton Harbour. It also lay close to the seaboard, so that there were ideal facilities for delivery of materials and removal of bye-products, and at the same time there was a direct outlet to the sea for discharge of drainage and disposal of refuse. The new works were commenced in 1898 in accordance with designs and to specifications prepared by Mr. W. R. Herring; the first section being completed in 1902 and the second in 1905, at a total cost of £842,000, including the land. The works were admitted to be among the most complete and up-to-date in the United Kingdom. The works already utilize fifty acres of the area.

In 1920, which was the final year of the existence of the Gas Commission, the Chairman was the late Lord Provost Chesser (Edinburgh), the Deputy Chairman was Provost Lindsay (Leith), and the Convener of Works was Councillor James Stewart (Edinburgh), who still occupies the Convenership.

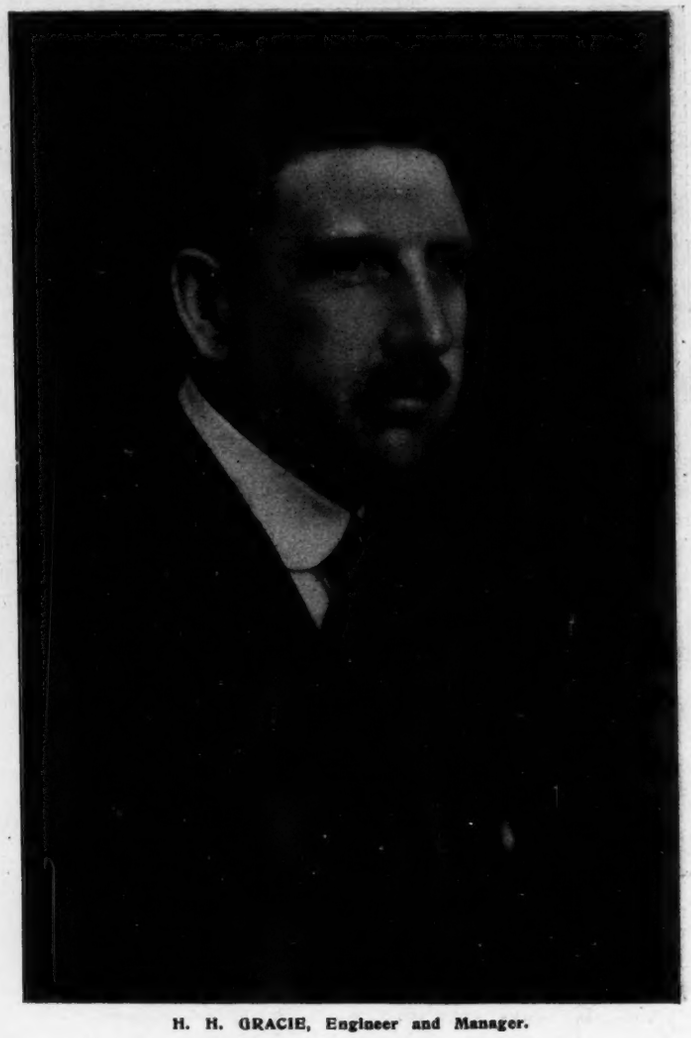
Under the Edinburgh Boundaries Extension and Tramways Act, 1920, the Gas Commission was dissolved, and its functions were transferred to the Edinburgh Corporation, which appointed a Gas Committee consisting of Convener, Vice-Convener, and fourteen other members to supervise the undertaking.

Development of the Undertaking.

In order to follow the growth of the undertaking and the present extent of the demand for gas, it will be convenient to mention certain financial and trading aspects of the concern, and to refer to some statistics of past years.

From the capital account, the total expenditure, including the purchase price of the various undertakings acquired, has amounted to £2,509,620. Of this amount £1,494,573 has been repaid, so that the outstanding capital debt is now £1,015,047. The capital represented by the old works has consequently been extinguished.

To meet the annual interest and sinking fund charges, and to



H. H. GRACIE, Engineer and Manager.

provide the necessary reserve funds as laid down by the various Acts of Parliament, a sum approximating 9d. per 1000 c.ft. of gas sold is required, and the further burdens of Local Rates and Imperial Taxes together represent a little over 6½d., making a total of 1s. 3½d. per 1000 c.ft. (or 3·1d. per therm). Taking the present price of gas—viz., 3s. 5d. (8·2d. per therm) for ordinary purposes—and deducting that amount, leaves 2s. 1½d. (5·1d. per therm) per 1000 c.ft. as the net sum to meet the cost of all materials and wages necessary for manufacture and distribution, repairs and maintenance, providing, fitting and upkeep of gas appliances, such as cookers, fires, &c., management, and all other incidental expenses. The total revenue during last year amounted to £596,839, and the working expenditure to £503,021; the difference representing chiefly interest and sinking fund payments.

In the manufacture of gas, some 200,000 tons are carbonized annually, which indicates the magnitude of the operations. In the busiest season, nearly 900 tons per day are used. In the process of distilling this large quantity of coal, not only the gas, but all the valuable bye-products are recovered. These are represented chiefly by 120,900 tons of coke, 12,900 tons of tar, and 2450 tons of sulphate of ammonia.

Amazing Growth in Production.

The total production of gas in 1890 was 1,273,345,000 c.ft. It has now reached 2,947,598,000 c.ft., representing an increase of 131 p.ct. Of this total increase, nearly 40 p.ct. has resulted from the last five years' working. This indicates that the demand has considerably more than doubled itself during the past 36 years. The production of gas for the past year was 153,097,000 c.ft. in excess of the previous year.

The maximum day's output is now 13 million c.ft. (65,000 therms), and an increase of 1 million c.ft. as compared with the maximum of the previous year. The number of consumers in 1890 was 65,000. It is now approximately 114,000—an increase of nearly 76 p.ct.

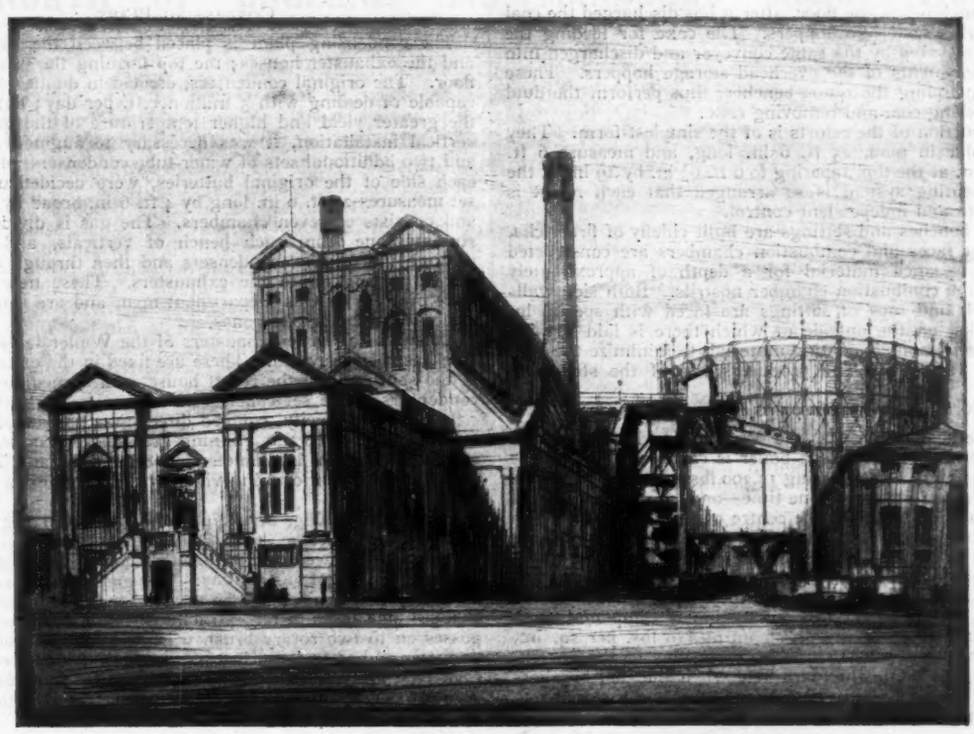
Gas is distributed over an area of about 50 sq. miles, from Joppa in the east to Balerno in the west, through 483 miles of mains, varying in diameter from 48 in. to 2 in. There are, in addition, over 1500 miles of service pipes, conveying the gas from the mains to consumers' meters. The wages bill amounts to more than £148,000 annually, and employment is provided for over 900 workers. There are 82,000 gas appliances on loan and hire, represented by cookers, fires, and other cooking and heating apparatus. This does not include appliances belonging to consumers themselves, and it is computed that there must now be a gas appliance in nearly every home in the city.

The Convener of the Gas Committee of the Corporation is Councillor James Stewart, who has held this office since the undertaking was transferred to the Corporation in 1920; the first Vice-Convener being Councillor W. J. Harvey, and the present Vice-Convener Councillor Angus Maclaine Gregorson. The Engineer and Manager at the transfer was the late Mr. Alexander Masterton, who shortly afterwards retired under the age limit, and was succeeded by the present Engineer and Manager, Mr. H. H. Gracie. The Assistant Engineer and Manager is Mr. J. Jamieson. The large extension of carbonizing and auxiliary plant and machinery now being inaugurated, and of which a description follows, brings the history of the Edinburgh undertaking up to date.

New Plant at Granton Works, 1924-1926.

No extensions of any material amount had taken place between the completion of the works in 1906 and the passing of the Edinburgh Extension Act, 1920. Owing, however, to the continued and increasing demand for gas for all purposes, the Town Council in 1924 approved of a scheme for the introduction of an improved type of gas generator in the form of vertical retorts, along with the necessary motive power and mechanical plant. In addition to and in anticipation of the extra yield from the new carbonizing plant, larger and more efficient exhausters, condensers, washers, scrubbers, and tar extracting plant have been installed. The combined schemes have involved an expenditure of roughly £250,000. It may be mentioned, however, that it is anticipated that this added capital burden will not increase the outstanding debt beyond what it was at the time of amalgamation (1920). Furthermore, when the new plant is in full operation under normal conditions, the economy in manufacture will provide for a reduction in the price of gas, notwithstanding extra capital charges.

Before deciding upon the adoption of vertical retorts, a Sub-Committee consisting of Councillor James Stewart (Convener), Councillor A. M. Gregorson (Vice-Convener), Judge W. J. Harvey, Judge F. J. Robertson, Councillor W. Baxter, accom-



THE HEART OF THE WORKS.

panied by the Engineer, visited the principal gas-works in Scotland and England, and inspected the different designs of plant, and ascertained the results being obtained in comparison with those from the existing inclined retorts. After full consideration and careful study of the various systems, it was finally decided to recommend verticals, on account of the possibility of concentrating plant and machinery for a large output on the unoccupied area available, the ease and convenience of working with Scotch coal, the comfortable conditions for the operatives, and the economy of manufacture.

Woodall-Duckham Continuous Verticals.

The new vertical retort installation has been provided by the Woodall-Duckham Vertical Retort and Oven Construction Company, Ltd It has a capacity of 11½ million c.ft. per day, and consists of two benches 169 ft. long by 21 ft. wide by 42 ft. 2 in. high, each containing eleven settings. Each setting comprises four retorts, one producer, one regenerator, and a waste-gas flue. The settings of retorts and the retorts themselves can be worked independently of each other. There are eighty-eight retorts in all, each capable of carbonizing 8½ tons of coal per 24 hours—a total of 748 tons per day. The new plant is erected at the south end of No. 2 retort house; the north end being occupied by two benches of inclines. The coal breakers, elevators, and conveyors previously fixed are utilized for feeding coal to the new installation.

The coal, after being broken, is elevated about 80 ft., and transferred to two cross push-plate conveyors, from which it is led into either of two new gravity lip-bucket conveyors, 530 ft. long; one of which encircles each bench. From these conveyors the coal is discharged at the rate of 100 tons per hour into storage hoppers each holding 748 tons, equal to 48 hours' requirement. These hoppers run the whole length of the house above the benches, and from them the coal is fed through a valve into auxiliary hoppers attached to the top mouthpieces of the retorts. Coke is discharged every two hours into skips propelled by hand on rails laid in the retort house floor. These skips direct the coke on to the gravity lip-bucket conveyor,

AERIAL VIEW OF THE WORKS.

fitted in a trench below the floor, after it has discharged the coal into the overhead storage hoppers. The coke for feeding the producers is elevated by the same conveyor and discharged into special compartments of the overhead storage hoppers. These conveyors, encircling the retort benches, thus perform the dual duty of delivering coal and removing coke.

The construction of the retorts is of the simplest form. They are rectangular in plan, 25 ft. 6 in. long, and measure 6 ft. 2⅝ in. by 8½ in. at the top, tapering to 6 ft. 6½ in. by 19 in. at the foot. The heating system is so arranged that each retort is under separate and independent control.

The retort benches and settings are built chiefly of firebricks, but the retort faces and combustion chambers are constructed of high-quality silica material for a depth of approximately 17 ft. below the combustion chamber nostrils. Both side walls of each bench and tops of settings are faced with special insulating bricks, on the outside of which there is laid a thick coating of special non-conducting material, to minimize the heat lost through radiation. The producers are of the step-grate type.

Waste-Heat Boilers and Power House.

Four waste-heat boilers of the Woodall-Duckham firetube type have been provided. Each boiler is capable, when all the retorts are working, of generating 14,100 lbs. of steam per hour. Only two boilers are in use at one time—one for each bench.

On the west side and near the centre of the retort house is a brick-built power house. One steam and two National gas engines, each of 135 H.P. are fixed here, and are coupled direct to Bruce Peebles dynamos, with an output of 90 KW. at 460 volts D.C. each. The chief source of power is provided by the steam engine, which is of the Browett-Lindley compound vertical condensing type, working on steam at 110 lbs. per sq. in., which is raised by the waste-heat boilers. One of the gas engines is used to take up the extra load when the coal breakers and elevators are at work. The other is used as a standby to either the steam or the gas engine.

Coke Handling Plant.

A complete coke screening and storage plant is provided outside the retort house on the east side. The coke, which is carried by the gravity lip-bucket conveyors encircling the benches, is discharged on to similar conveyors running at right angles. Immediately outside the house these rise vertically, and thereafter the coke may be dealt with in three different ways:

(1) It may be discharged from the conveyors on to either of two "Broncho" screens, to remove the breeze; the large coke being delivered through a hopper into railway trucks, the breeze being collected in another hopper, from which it falls into either trucks or skips.

(2) It may be taken past the "Broncho" screens, and dumped on to a shuttle band conveyor running at right angles, alongside and above the reinforced concrete storage hoppers. This band discharges the coke into any one of six rotary screens, each having a capacity of 50 tons per hour, and placed immediately above the hoppers. These screens grade the coke into three sizes—viz., large nuts and breeze. The hoppers are divided into suitably-proportioned compartments to hold the resulting quantities of the various grades; and their total capacity is 500 tons, or roughly 36 hours' production.

Underneath the bunkers, chutes are fixed for loading the coke and breeze into railway trucks or skips, either for sale or for use on the works.

(3) The coke which is not to be immediately used or sold is carried on the conveyor past both the screening plants described, and emptied on to a band conveyor about 400 ft. long running northwards to the yard. This band conveyor is covered in, and is fixed on trestles about 50 ft. above the ground. At the end of this conveyor the coke is dropped on to a shuttle belt conveyor working on a covered gantry about 45 ft. from the ground, and is thereafter discharged on to the yard through iron chutes, which prevent breakage. In this way some 8000 tons of coke can be binged without manual labour.

Condensing Plant.

The condensing plant is placed between the vertical retort and the exhauster houses; the top forming the communicating floor. The original condensers, erected in duplicate, were each capable of dealing with 5 million c.ft. per day; but in view of the greater yield and higher temperature of the gas from the vertical installation, it was necessary to augment this plant; and two additional sets of water-tube condensers, placed one on each side of the original batteries, were decided upon. Each set measures 22 ft. 6 in. long by 4 ft. 6 in. broad by 16 ft. high, and consists of seven chambers. The gas is divided into two streams, one from each bench of verticals, and flows first through the original condensers and then through the new set before passing on to the exhausters. These new condensers were built-up by Gas Department men, and are similar in construction to the original ones.

A new set of large exhausters of the Waller latest four-blade type has been provided. These are fixed in the exhauster house at the south end of the retort house, and immediately after the condensers. The set consists of two units, each of 6½ million c.ft. per day capacity, coupled direct to a horizontal compound steam engine of 88 H.P. running at a speed of 60 R.P.M. Each exhauster is 57 in. in diameter by 48 in. wide, and is capable of creating a vacuum of 6 in. while working against a pressure of 36 in.

The new washing, scrubbing, and tar extracting plant is of Holmes' latest design, and is situated at the north end of the building, to the west of No. 2 retort house, and has a capacity of 7 million c.ft. of gas per day. The gas is first passed through a Livesey washer, and is then treated for the removal of tar in a Pelouze and Audouin tar extractor, 6 ft. in diameter. The gas passes on to two rotary brush washer-scrubbers, each 10 ft. in diameter and 28 ft. long, in two sections. Liquor coolers of the rack type are erected outside in four units, to reduce the temperature of the liquor in circulation in the retort house mains to that of the atmosphere.

Gas Boosting Plant.

To meet the continually increasing output of gas, and to supply the city efficiently, a new gas boosting plant, for pumping the gas from Granton to Edinburgh, has been installed. It consists of two Keith-Blackman fans, driven by direct-current motors, the capacity of each being 750,000 c.ft. per hour, and the difference in pressure 35 in. A 26-in. Peebles station governor has also been put in to maintain a steady outlet pressure. The method of loading-up for augmenting pressure is novel, as the maximum weight required amounts to over half-a-ton. As this has to be dealt with quickly, manual labour was out of the question. Water loading was next considered; but this also involved considerable time. It was therefore arranged to use the high inlet gas pressure through an auxiliary governor which requires weights of only a few ounces to obtain the necessary range. This is simple and ingenious, and brings about the desired result with a minimum of trouble, and as quickly as is necessary.

The Future.

From the foregoing description it will be seen that there is now at Granton a fully equipped modern gas-works with the latest machinery and plant, designed for easy manipulation and economical working. In visualizing the future, it may safely be predicted that there is every prospect of further great advances being made in both manufacture and distribution, accompanied, in normal circumstances, by reductions in cost and cheapening of the product. In the recent words of the President of the Board of Trade, Sir Philip Cunliffe Lister:

"There is unlimited scope before the industry; and, with the scientific developments which have taken place, anyone who begins to appreciate what the gas industry has passed through must be certain that it has a great and expanding future before it. . . . I am sure that the industry has a great future, and that it is entitled to claim that it should be regarded both as a public utility service of the highest importance to the social life of the country and also as a progressive chemical industry. Its development is vital to the industrial prosperity of this land."

Lectures.—At the invitation of the Enfield District Rangers, Mr. Samuel B. Chandler, A.M.I.Mech.E., of Tottenham, gave a lecture on Oct. 1 at the Council School, Trinity Street, Chase Side, Enfield, on "Gas Supply and its Service to the Public." At one of their recent meetings at Winchmore Hill, Mr. Chandler also addressed the Southgate Rotary Club, on the subject of "The Gas Industry and the Community."

Sir John Cass Technical Institute.—The twenty-fifth session of the Institute was inaugurated on Oct. 4, when Sir Charles Wakefield delivered an address. The Rev. J. F. Marr referred to the resignation of Dr. Keane, who had been Principal for nearly 25 years, and the appointment of Mr. G. Patchin as his successor. In the course of his address, Sir Charles said he thought that during the last few decades the social factors that disincline young men and women to serious study have more than kept pace with the development of educational facilities. Cultural impulses have to contend with innumerable opportunities for pleasurable time-wasting.

"James Forrest" Lecture, 1926.—It has been arranged for this lecture, which was intended to be given in May, but had to be postponed, to be delivered at the Institution of Civil Engineers on Tuesday, Oct. 26, at 6 o'clock. The lecture will be given by Senator G. Marconi, G.C.V.O., Hon.M.Inst.C.E., on the subject "Radio Communications." Before the lecture, the Kelvin Medal for 1926, which has been awarded by the Kelvin Medal Committee to the Hon. Sir Charles A. Parsons, K.C.B., F.R.S., M.Inst.C.E., will be presented to him by Sir William Ellis, G.B.E., the President of the Institution. The Kelvin Gold Medal was established in 1914 as part of a memorial to the late Lord Kelvin, and is awarded triennially by a Standing Committee consisting of the Presidents of the principal representative British Engineering Institutions, for pre-eminence in the branches of engineering with which Lord Kelvin's scientific work and researches were closely identified. The first award was made in 1920 to Dr. W. C. Unwin, F.R.S., and the second in 1923 to Prof. Elihu Thomson.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

AUTUMN MEETING.

A feature of the Autumn Meeting of the Association, held at Hexham on Friday, was the attendance of the whole of the Directors of the Hexham Gas Company. Another token of the popularity of Mr. Herbert Lees, Managing Director of the Company, who is President, was the large attendance of members of the Association and kindred organizations. Proceedings commenced with a luncheon served in the Queen's Hall, where the meeting was also held. Following the luncheon, the company paid a visit to the works of the Hexham Gas Company, where the vertical retort installation was inspected. Mr. Herbert Lees occupied the chair at the functions, and was supported by Mr. Norman S. Cox (Hon. Secretary of the Association), Mr. W. Pattinson (Chairman of the Hexham Gas Company), and others. Among representatives of kindred organizations were Messrs. Thwaites and Nicholson, of the Northern Coke Oven Managers' Association.

Luncheon.

At the luncheon, Mr. W. Pattinson proposed "The North of England Gas Managers' Association," and welcomed the members and visitors on behalf of the Hexham Gas Company. He understood that this was the fiftieth year in the history of the Association; and by Mr. Lees' selection to occupy the office of President, the Company shared in some measure the great honour which was attached to the position. More so because it was not the first time that Mr. Lees had held the office. Those who were present on the last occasion, in 1895, would note a great change in the works. Owing to the growing demand for gas, it was found necessary for the Company to increase the capacity of the works. Under the guidance of Mr. Lees, they had installed what they believed to be the most modern gas-making plant in the country. The work was carried out by West's Gas Improvement Company, Ltd., under the supervision of Mr. H. Douglas Lees, a son of the President, who had since been appointed Engineer to the Hexham Gas Company. The Company wished every success to the Association, because they believed that the benefits derived from meeting together could not fail to be of permanent benefit to the industry in which they were all so deeply interested. There was scope for both gas and electricity in this country. All they asked for from the Government was equality and fair play. Given those two essentials, which they believed to be necessary to all business undertakings, he was confident the gas industry would hold its own, and progress in the years to come.

The President, responding, thanked Mr. Pattinson and his colleagues, on behalf of the Association, not only for the words of welcome, but for the very deep interest he had shown in all arrangements for the meeting. It was gratifying to him personally to see all the Directors there, the more so as he knew their attendance had not been without some inconvenience. The success of the Association was in no small measure due to the sympathy which had been extended by the Directors and Committees of the undertakings the members served. The gas industry was in a sense one great organization. Its component parts formed separate units, but the relationship was such that the strong could, and did, help the weak. The industry was one of great activity, and provided scope for workers in many branches, all of which were full of interest. The members of the Association were doing what they could to bear their share of the work and responsibility involved in that great enterprise. They felt that those who founded it had a great ideal; and they had lived to see that they "builded better than they knew." The founders had left them a great heritage; and they desired to pass it on to their successors as a more powerful instrument for the good of the industry and of the community they served.

Mr. Norman S. Cox proposed "The Visitors," and said he would like two gentlemen to reply to the toast whose names were prominent in the industry—Alderman F. J. West, of Manchester, and Mr. F. N. Hepworth, of Carlisle, a son of one of the founders of the Association.

Alderman F. J. West, in reply, said he felt it a great privilege to be present at a gathering to celebrate the jubilee of a well-known Association. They joined in congratulations to the Association, not only on attaining its jubilee, but on securing for President Mr. Lees, who had done so much service for the Association. In these days of pessimists, and those who tried to depress them with regard to the future of engineering and of the country's trade, he thought it could be said of the gas industry that it was one section of engineering that was keeping pace with the times, and setting all other countries an example. From his knowledge of the best cities of Europe, and the observations he had made in the United States and Canada, the gas industry of this country not only held its own, but set examples in development which others followed. There was no room in the gas industry for pessimists, or those depressed—indeed, there was justification for thinking that the gas industry had risen to the occasion at a time of national need. The coal strike would have been brought home more closely to people, if the gas industry had not responded in the way it had.

Mr. F. N. Hepworth recalled the fact that for a short time he was one of the Directors of the Hexham Gas Company; and said he was sorry to sever his connection with them.

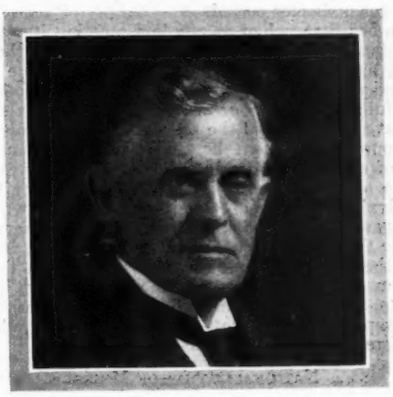
Glover-West Vertical Retorts.

The installation of Glover-West vertical retorts comprises eight retorts of the 33 in. "New Model," specially designed for producing a 450 B.Th.U. gas from Durham coal. The retort bench is divided into four separately heated pairs of retorts, each retort being a distinct unit for operating purposes. The retorts are heated by producer-gas generators in duplicate. These are of West's patent type, with a large grate area, arranged to prevent the formation of clinker.

Coal is brought to the installation in road vehicles, which are discharged into a receiving hopper at ground level. From this it is fed mechanically in adjustable quantities to a coal breaker. The broken coal is elevated to, and distributed in, the 48-hours' storage bunkers above the retort bench by means of a West's lip-bucket conveyor, which, encircling the bench, also receives the coke as discharged from the retorts, and elevates it to a storage hopper alongside the retort house.

The retort house building and the coke storage hopper are of steel-framed design with brick panels. The whole of the mechanical portions of the plant are actuated by Crossley gas engines in duplicate, each of 25 h.p., with a further stand-by engine of the same make of 3 h.p., capable of driving the coke extractor gear alone. The waste-heat recovery plant consists of a West-Galloway water tube natural-draught boiler, arranged to operate in parallel with the chimney. It is capable, together with the superheater, of raising 750 lbs. of steam per hour at a pressure of 100 lbs. per sq. in., and superheated to 250° C. In addition to the usual fittings, the boiler is fitted with the "Thermo-feed" automatic feed-water regulator and "Hilo" water-level alarm.

The plant was designed for a capacity of from 400,000 c.ft. of gas per diem, when carbonizing second-class Durham coal; and this has been fully realized in practice.



THE PRESIDENT,

Herbert Lees, of Hexham.

Business Meeting.

At the meeting which followed the inspection of the gas-works, the Hon. Secretary announced the receipt of a number of apologies for absence.

New Members.

The following new members and associates were elected:

Members.—Messrs. A. L. Robertson, Wigton; W. B. Hetherington, Keswick; and A. F. Young, Cockermouth.

Associates.—Messrs. R. A. Fairless, Newcastle; W. A. Leaver, Sunderland; D. B. Laws, Sunderland; C. C. Markham, Newcastle; K. Snowdon, Hexham; S. George, North Shields; and H. Galloway, Whitby.

PRESIDENTIAL ADDRESS

OF

Mr. Herbert Lees, of Hexham

Gentlemen,—When the members of this Association elected me to the position of President more than thirty years ago, I recognized they had conferred upon me the highest honour at their disposal, and appreciated it accordingly. Since then you have given to me all the honours which the passage of time and the changed circumstances of the years have made possible; and if in acknowledgment of your goodwill and generosity I could say all that I feel, it would seriously trespass upon the time which should be devoted to saying and doing those things you have a right to expect from your President. My appreciation of the distinguished honour of being elected to this position for the jubilee year is not to be measured in words, and I am the more anxious to justify your choice in other ways. Therefore, anything I can do to maintain, and if possible enhance, the value of the Association shall be done to the best of my powers; and in this endeavour you will, I feel sure, give me your loyal support.

The Coal Stoppage.

The occasion of a jubilee year would suggest that some reference should be made to the history of the Association, but as another opportunity will come at the Spring Meeting next year, which synchronizes with the birth of the Association, it will perhaps be more appropriate if at this stage I refer to some of those matters which for some time have been engaging our attention. It is usual during the summer months for those in charge of gas-works to be energetically engaged in carrying out the repairs and renewals necessary to put the plant in good working condition for the heavier winter demands. But much of that energy has been directed into other channels in recent months; and those who have been able to do the essential minimum of such work will have a feeling of satisfaction which in normal years they do not experience. We need not stop to discuss whether the coal industry has been engaged in a "strike" or a "lockout." The experts on these terms are not sure about it—sometimes they use one and sometimes the other. But as a "strike" is the more common experience, that word more readily comes to the lips. So far as the users of coal are concerned, it is a "stoppage;" and it is from that standpoint we view it.

The three months' stoppage in 1921 was not without its lessons to those who are dependent upon coal; and the gas industry was not unprepared when the trouble commenced this year. There was a time when a stock of coal equal to six or eight weeks' requirements was regarded as adequate; but in 1921, if not earlier, this figure was revised, and though there were few men who thought there would be another three months' stoppage, it could not be considered prudent to make provision for a shorter period.

I remember that, when at our last meeting it was suggested that the date of this one would be affected by the conditions prevailing as regards coal supplies, it raised some incredulous smiles; and yet the apparently impossible has happened, and we are cheerfully pursuing our way. Whatever anxiety there is, or may have been, behind the scenes, the inconvenience has not to any appreciable extent been felt by the consumers. The methods of carbonization which have, in recent years, made it possible to obtain a much higher yield of gas per ton of coal, and the flexibility to be obtained by the use of water-gas and complete gasification plants, have been of great service; and it is probable that in some cases it would have been impossible to maintain the supply without these aids. Even in these favourable circumstances there have been anxious days, if not sleepless nights, when we wondered what the character of the auxiliary supplies of coal would be, and if they would reach the works before stocks were exhausted.

Nationalization of Mines.

There was solid ground for this anxiety, having regard to the experiences of war-time supplies, when some Government official in London plotted out on the map a number of spaces with ragged edges, and told us that we must get our supplies without trespassing beyond the boundary of our own allotment. This method produced some "Gilbertian" situations and some extremely inconvenient, if not impossible, conditions. Nevertheless, we won through, but not by working strictly to the rules and regulations. One deduction we made from that experience was that the nationalization of the mines was not likely to be helpful, inasmuch as these matters would always be subject to interference by Government departments, and that freedom of choice, which is so important to the gas manufacturer, both as regards price and quality, would be seriously curtailed. To this experience was added that of 1921, when it was much more difficult to get coal of a suitable character than it was during the war. Some of that which was imported did not encourage those who tried it to ask for a further supply from the same source; and I have not heard of its being imported during this crisis. Coal has been imported from the Silesian and Westphalian coalfields, and some from the former source has found its way into gas-works without meeting with an enthusiastic welcome. The supplies from Westphalia have been of a less unsatisfactory character; but the imported coal which has been described as being as good or better than the best Durham coal has come from America. The supplies from this source have been invaluable to the large undertakings. Many of the small works have been able to get adequate supplies from the small local collieries which have been at work during the greater part of the stoppage—some all the time. The men who have made it possible for this to be done have rendered a real service to the community, which, after all, is greater and more important than any of its parts.

Loyalty of the Gasworkers.

I think it is permissible to make a digression here, to pay a tribute to the men employed in the gas industry. When the general strike was called, many of them were in doubt as to what was expected of them by their Unions. They had no information apart from that which appeared in the Press; and it would not have been surprising if some, from a sense of loyalty to their Union, had mistakenly regarded this as enough for them to act upon and withdraw their labour. Fortunately, they were not without a feeling of loyalty to their employers and to the community, and some recognized that they could not legally leave their employment without notice. The relationships which exist between the gas undertakings and the Union of which the men are, for the most part, members, are of a very satisfactory character, and we have therefore no cause for complaint of the attitude of the men or their leaders during the general strike. If the relationships in other industries were of an equally satisfactory character, we should be less familiar with the word "strike."

I have taken the opportunity of making inquiries as to any experience of an exceptional character that may have taken place within the district; and the most satisfactory feature of this inquiry is that there was very little to report. I know of only one, and that a very small, undertaking which has failed to maintain a supply of gas throughout the whole period; and it need not have happened in that case if their wants had been known sooner. Eventually they communicated with the National Gas Council, and, though not members of that organization, steps were immediately taken to secure a supply of coal; and the gas supply has since been maintained. One undertaking had on two occasions to resort to carburetted water gas entirely for short periods. Another on four occasions was within 24 hours of the end of its coal stocks. Sawdust mixed with tar was resorted to, and wood logs in conjunction with coal were used in a Tully plant.

Experience with American and German Coal.

The experience with American coal has not been of an entirely satisfactory character in all cases. The following comments came to me from a works where Durham coal is not used, and where in ordinary circumstances 86 therms per ton of coal carbonized are obtained:

> At the time of writing we have only dealt with one consignment of American coal, specified as "Kanawha unscreened" and imported by the Government. This coal yielded the following analysis:

	P.Ct.
Moisture	3·2
Volatile combustible matter	33·3
Ash	3·1
Fixed carbon	57·4
	100·0

> The analysis would lead one to expect results much better than those which were actually obtained. In the retorts (Glover-West verticals) the coal was very sticky, and did not travel freely. The coke was not good, containing large hard lumps, mixed with a big percentage of breeze and dust. The coal seemed to resist the action of the steam, with the result that the gas yield was small, but of a high calorific value. A proper test could not be made, but the approximate carbonizing result was 16,400 c.ft. per ton of 475 B.Th.U. gas—or nearly 78 therms per ton. Though the ash percentage was relatively low, the coke formed a great deal of clinker in the producers; and this, by lowering the heats, added to the difficulties of working, and contributed to the poor result.

The same correspondent made some observations on Westphalian coal, which may be of interest for future reference:

> We have carbonized two cargoes of Westphalian coal, with only very moderate results. The first consignment was an unscreened coal, and gave the following analysis:

	P.Ct.
Moisture	1·6
Volatile combustible matter	24·4
Ash	10·0
Fixed carbon	64·0
	100·0

> This coal, like the American, gave considerable trouble in working. It hung-up badly in the retorts; and the coke, though of fairly good appearance, proved a very dirty fuel. The approximate make was 18,400 c.ft. at 420 B.Th.U., and a little over 77 therms per ton.
>
> The second consignment of Westphalian coal gave a very similar result—18,000 c.ft. at 427 B.Th.U., nearly 77 therms per ton. It was a screened coal, however, with the following analysis:

	P.Ct.
Moisture	2·0
Volatile combustible matter	26·5
Sulphur*	1·4
Ash	5·0
Fixed carbon	65·1
	100·0

> *N.B.—The other samples were not tested for sulphur. The low ash percentage of this coal will be noticed. The coke was of good quality, and proved an excellent fuel; the coal also gave very little trouble in the retorts. An analysis of this coke gave the following figures:

	P.Ct.
Moisture	2·0
Volatile combustible matter	0·2
Ash	7·0
Fixed carbon	90·8
	100·0

Gas Consumption during the Stoppage.

The effect of the scarcity of coal on the consumption of gas has varied greatly. It is evident from this that in some places

there has been a better supply of coal for domestic purposes than in others. One undertaking reports that the increase over the corresponding period of last year is equal to the increase of the previous ten years, another shows 30 p.ct. increase, a third 25 p.ct. increase, and others have smaller but substantial increases, while in a few undertakings there has been no appreciable difference. It can be said generally that a great stimulus has been given to the use of gas cookers and similar appliances, and we may reasonably expect that the gas industry will reap the reward of further increased business.

It needs to be stated, however, that, although the industry has again played a most important part in a national crisis, it has done so at a great cost. In some cases the cost of coal has been more than three times that which obtained before the stoppage. The difficulty of getting the necessary material for carrying out essential repairs to works and such extensions as were necessary cannot fail to have added to the cost; and for some time to come we may be faced with higher prices for all the commodities we need, in addition to bearing our share of the increased rates which are being levied and which will certainly be heavier than they have been for years. We may be told that we can increase the price of gas to meet the changed conditions, which is true; but those connected with the industry know how reluctantly this step is taken, and though it has become essential for some undertakings to do so, the consumers may be assured that the advance will not remain on longer than is necessary. If undertakings are able to carry on without any increase, it may be assumed that a possible early reduction has been postponed. These are matters which each undertaking must always decide for itself; but the Acts of Parliament under which statutory undertakings are carried on are so framed as to give the fullest protection to the consumers. Moreover, it is generally recognized in the gas industry that to sell gas as cheaply as possible is good policy.

Changing Public Opinion.

Before leaving this subject, reference may fittingly be made to the changed attitude of men in high positions in the State and in the Press towards the industry. There was a time, not very long ago, when certain sections of the Press seemed to delight in writing "flesh-creeping" articles about the dangers of gas, drawing inferences from isolated cases which were unwarranted and misleading. But to-day we read articles complimenting the industry on its "utility and efficiency in the present industrial crisis." Men of eminence ignored its very existence when they were dealing with the subject of conservation of coal. They talked about low-temperature carbonization in a way which only exposed their ignorance of the problem, and they seemed to have persuaded themselves that in some way the reconstruction of the trade of the country could only be accomplished by combining low-temperature carbonization with electric power plants—which of course meant that these would be installed at the collieries. Whatever value in such a scheme the future may disclose from the technical and economic standpoints, the experience of these past months clearly indicates that there can be no security of supply from plants installed at collieries. In this connection it may be mentioned that the gas undertakings which were dependent upon a supply of gas from coke ovens have had to bring their stand-by gas plant into operation to meet the exigencies of these times, which confirms the view held in the industry that no gas undertaking can rely entirely upon a source of supply which is outside its own control. We know that all agreements made for a supply of gas from coke ovens have a protective clause in favour of the seller which exempts him from liability of supply in the event of a strike or lockout.

To return to the attitude of men highly placed, it will be noticed that the President of the Board of Trade has recently appointed a National Fuel and Power Committee in accordance with the recommendation of the Royal Commission on the Coal Industry, and that Mr. D. Milne Watson, Governor of the Gas Light and Coke Company and President of the National Gas Council, is a member of that Committee. This is but one instance of the recognition of the value of the industry to the nation; and though it is belated, we welcome it, and we may surely hope it will not be forgotten when the crisis is passed. If some such representative Committee had been appointed eight years ago, much of the reckless and misleading propaganda on the subject which started at that time might have been avoided, and schemes of reconstruction could have been carried out on lines more in accordance with the needs of industry, and some real progress made. One of the dangers to which men who seek the suffrages of the people are faced is that it is easier to coin a "slogan" than to get at facts; and trade-union leaders are not alone in falling a victim to this.

This change of attitude has not been brought about without persistent effort on the part of those who speak for the industry. The publicity work of the National Gas Council and of the British Commercial Gas Association has been of untold value; and this has been supported in various ways by some of the larger undertakings. The districts in which these enterprising concerns are placed have shared the benefit of their work.

Gas in Housing Estates.

The success of the gas industry has never depended upon "patronage" in the sense in which that term is frequently used. In its earliest days it had to fight against the prejudices of a slow-moving people, and its sponsors had great difficulty in persuading Parliamentary Committees that it could be used with safety. It had its birth in a cottage, and it has penetrated thence into almost every cottage in the land within reasonable distance of a gas-works—and the latter are to be found in nearly every village of a few hundred inhabitants. Yet there are men, who claim to represent the people to whom this has been, and still is, the greatest boon, who advocate the erection of houses in which gas shall have no place for any purpose. Such advocacy is not in the interests of the people. If smoke abatement is to be encouraged, the introduction of gas for cooking, heating, and other purposes into the "homes for the millions" is an essential feature of their equipment; and if economy is to be a consideration—and surely it ought to be—it is pre-eminently the most suitable for lighting also. To give the tenants no choice in the matter is to place them at a permanent disadvantage. This question of smoke abatement does not receive the attention its importance demands from many local authorities who could do so much to further it, and the people themselves do not realize its value, notwithstanding all the efforts of the Smoke Abatement League and the example set by the medical profession.

It might be supposed that Hexham is not an appropriate place in which to urge the need for less smoke. Compared with many other towns it may not be; but to those who take their walks into the uplands on a quiet evening in the spring or autumn, it will be evident that there is a great deal of work to be done before the atmosphere of this delightful district is as pure as it ought to be. The pall of smoke which hangs over the town on these occasions convinces me that, notwithstanding all that has been done in the direction of installing gas appliances for domestic use, there is still a wide field to cultivate. If this is so in a town such as this, what must it be in towns with which some of you are familiar?

Those advocates of the gas-less house to whom I have referred often have one of two arguments, and sometimes both are used. When the rival undertaking to the gas company is owned by the local authority, the argument is that the people should support their own shop; and so "should" is converted into "shall." The second argument is that what the rich can get, the poor should not be deprived of. We know this to be very dangerous teaching; and by its enthusiastic application many a man who might have become rich has sunk into deeper poverty. But though the gas industry was born in a cottage, it has not confined its activities thereto; it has become the servant of all classes of the community for domestic and industrial uses. A few weeks ago we were informed that the gas supply to Buckingham Palace was being brought up to date; and a photograph indicated that the size of main used was large enough to supply a moderate sized town.

Progress of the Industry.

I do not propose to trouble you to-day with statistics to show what progress has been made. You are familiar with them; and if others who are not should trouble to read this address, they would perhaps not be interested in figures. Those of us who are working within the industry know the strength of the position; and others who may be interested as shareholders and have noticed the position of many industrial concerns to-day will have a feeling of satisfaction which comes to the man whose investments have been wisely placed. Sometimes, however, investors in gas stocks get nervous; and we need not be surprised at this if we remember how the gas industry suffered financially during the war years because of the operation of the sliding-scale under conditions which no one could have conceived possible when the standard prices were fixed in the Acts of Parliament under which we then worked. Admittedly a great work was being done towards winning the war—and that under the greatest difficulty. And when it was proposed to provide by legislation for the payment of three-fourths of the standard dividend—which standard was usually not more than 5 p.ct. per annum, and in some important undertakings 4 p.ct. and under—it met with considerable opposition. There were many then who no doubt were tempted to sell out their holdings, and re-invest the money in industrial concerns. They may be glad to-day that they held on.

The "N.G.C."

This is another instance of the value of the National Gas Council, who put the case for the gas industry before the Government in a way that eventuated in the passing of the Gas Regulation Act, 1920—one of the objects of which was to restore the financial position of the gas industry to a condition relative to that which obtained prior to 1914. It is impossible to overestimate the value of the work done by that organization, but it is obvious to those who give any thought to the matter that, in the post-war years, the industry would have been in a parlous condition without some such representative body to speak and act on its behalf. That the work has been exceedingly well done is borne testimony to by those eulogies previously referred to. While on this subject, I should like to express the appreciation of the members of this Northern District of the eminently able and untiring services rendered by Mr. D. Milne Watson as President, and of the very excellent work of the chief executive officers and staff of the Council.

Need for Personal Effort.

But my object in referring to these matters would not be wholly gained if I failed to emphasize the need for continual personal effort on the part of the rank and file of the gas industry. Personally, I have great faith in the ability and enthusiasm of the young men actively engaged in the work, and perhaps may claim to have been in closer touch with them than most men of my own generation. More than twenty years ago I was urged by the Committee of this Association to undertake the work of conducting classes in Gas Manufacture and Gas Supply at Rutherford College, Newcastle-upon-Tyne; and, with some diffidence and misgivings, I consented. I am fully conscious—perhaps more so now than then—that my qualifications for the office were inadequate; but I did my best to play the rôle of a fellow-student with my pupils, and had the satisfaction of seeing some of them do exceedingly well in the examinations. What has been even more gratifying is that their progress since those days has been good to watch. Some with whom I have been associated in this and in other ways have occupied with distinction the Presidency of this Association, and one is at the present time President of a kindred Association. Others have taken a prominent part in salesmen's organizations, and occupy responsible positions of various kinds on the staffs of large gas undertakings. I claim no credit for this unless it be that the being helpful in directing their studies in the formative period of their career Their practical training and experience was gained apart from their class-work; and it must be equally gratifying to those under whom they served to have marked their usefulness and progress. Further, while occupying the position of Hon. Secretary of this Association, I was privileged to make the acquaintance of the young men as they joined our ranks; and I have noted their equipment and enthusiasm for the work. The first of these characteristics has been a developing one, but there is always a danger that with increasing years and added responsibility the enthusiasm may wane. This needs to be guarded against; and if I may make a suggestion to those who need a warning, it is this: Cultivate the acquaintance of the younger men. You may be able to help them out of your experience, but they will certainly infuse some of their enthusiasm into you, and the result will be a mutual benefit. The meetings of this and like associations provide an excellent opportunity for this, and still more can be done by making opportunities.

The Managers of Small Works.

If not wearying you on this topic of the personal equation, I should like to refer to the experience which has come to me in connection with my association with men in whose hands the destinies of very small works largely rest. Occasionally one has met with the type of man who resents interference or guidance from anyone, and invariably he is a man who needs both. It is not beyond the bounds of possibility that he may eventually make the discovery himself, and become a reasonable and more useful man. There are, however, men occupying such positions whom it is a pleasure and a privilege to work with; and my experience is that this is the predominant type. They may not have the theoretical knowledge which is possessed by those whose opportunities for education have been greater, but frequently they have a fund of sound sense—which is not too common—and resource that enables them to do the right thing in difficult circumstances; and their working results are such as men in more important positions would not be ashamed of, and they have also a keen interest in their work. Such men are not only learners, but unwittingly may become teachers also; and if the small undertakings with all their disadvantages continue to be in charge of men of this type, that end of the gas industry will not fail.

Grievances.

Occasionally one hears a murmur of dissatisfaction with the conditions and terms of service in the industry, and complaints are made that the Institution of Gas Engineers does not take steps to guard the interests of its members when some grievance—real or supposed—is made known. Let it be remembered that the Institution has not been organized for any such purpose, but for making men better fitted for the responsibilities they are called upon to fulfil. The success of its legitimate work would be seriously hampered if it stepped aside in order to act in the capacity of a Trade Union. Such protection has not the effect of increasing the efficiency of those who rely upon it for security, and there is no reason to suppose that it would act differently upon those who hold executive positions in our industry. Two things are essential to securing the confidence of those whom we serve—namely, ability to do the work for which we are engaged, and character; a combination of qualities calculated to win success in this as in other industries. Having said this much on one side of the question, perhaps it will not be considered impertinent to make some observations from the standpoint of those who have a legitimate grievance. In the course of my experience I have served local authority and company undertakings, and have also served in the capacity of a Councillor and of a Director, and can therefore look at the question from both angles. The men who act in the position of Councillor and Director respectively are, so far as human nature is concerned, very much alike; and what difference (if any) there is, as between one position and the other, must be attributed to the environment or conditions of their respective offices. The director of a company undertaking must have a personal financial interest in the concern, and probably has friends likewise interested who look to him to see that it is so conducted as best to conserve those interests. If he is a good business man, he will apply the principles which guide him in the conduct of his own business affairs. He will soon discover whether or not the executive officers know their jobs and can be trusted to do their best for the company; and if he is satisfied on these points, he is not likely to be so unwise as to put hindrances in their way. His position has a sense of permanency about it, and the policy of the board has a continuity which is less easily obtained where there are frequent changes on the governing body. This advantage of continuity—which, let it be remarked, does not mean stagnation—can best be obtained if the changes of the chief officials, when working in harmony with the board, are not frequent. To ensure this, the good director will wish to retain their services, and will do whatever is reasonable to that end. He will not need to send round a questionnaire to other undertakings to ascertain the terms and conditions of service attached to similar appointments, but will trust his own judgment, and have the courage to act upon it.

The position of a member of a Committee of a local authority owned gas undertaking is less stable. It can be said, however, that on many of such Committees there are one or more outstanding personalities whose ability is such that they command the confidence of the public whom they serve long enough to acquire the experience that is necessary to give that competent direction which leads to a successful policy. But elections are contested on a variety of issues, many of which have not the remotest connection with the undertaking concerned; and even when the policy of the gas undertaking is one of them, the man with the "slogan" is at least as likely to succeed as the man of experience who faces facts. Therefore the experienced men on the Committee do not always get that help and support which the circumstances demand. Frequent changes in the personnel mean that there must always be a percentage of men who need to learn their duties. If they always possessed that humility which is essential to the learner, all would be well; but this is a quality which does not meet with the encouragement it deserves at the hands of the public. In the consideration of schemes of expansion, the policies of other departments have to be taken into account, and rivalries are set up when there are competing interests, and sometimes when there are not, and the words "economy" and "inopportune" are used in great profusion in the public utterances of men whose object is to defeat proposals which are essential to the development of the gas undertaking. One result of all this is that the official upon whom rests the responsibility of keeping things going has much of his time taken up in preparing reports and schemes, revising them from time to time; and not infrequently, after having spent weeks—if not months—of valuable time, they are put off for another year, when the process is more or less repeated. In the meantime his energy is being sapped by the worries and anxieties which the delay inevitably causes. Such a policy as I have outlined is not good for any undertaking; and it needs to be said that whether it be owned by a local authority or a company, those who have the responsibility should consistently promote and conserve its interests and those of the consumers whom it serves—and to whom it has a statutory obligation to maintain a satisfactory supply of gas—irrespective of external influences and interests. It is possible for even a small minority of a governing body to act in such a way as to make it difficult for the officers to carry on their work satisfactorily. I am here reminded of a quotation which has done service on a former occasion and which is appropriate in this connection—namely: "No man can do good work with a heavy discouraged heart—as well expect an artist to achieve a masterpiece in a foggy November. Atmosphere always counts for something."

It may seem an audacious thing for the President of an Association composed of men who serve, to utter a word of counsel to those who have authority over them; but being in the position of having served a company for more than thirty-five years without having had so much as a misunderstanding with the Directors, and having no personal grievance, I can speak without making my position precarious or hurting the feelings of those with whom I am so happily associated.

Amalgamation.

The question of control brings me naturally to another phase of gas administration to which our attention has been directed. The importance of giving consideration to schemes of amalgamation, where these can be carried out advantageously, is being urged upon gas undertakings. This may take the form of (*a*) linking-up and supplying gas for the combined areas from one central manufacturing station, or (*b*) it may be expedient to utilize the existing works of the undertakings amalgamated, either with or without the mains being connected in the first instance. When amalgamation is approved, it will generally be found expedient to link-up the mains; and circumstances and experience will decide whether or not the gas can be most economically manufactured and distributed from one centre. It may be asked: Why amalgamate if it is not immediately advantageous to link-up the works? The answer to this question can only be determined by the circumstances of each

particular case. In that of the smaller undertakings contiguous to each other there may be decided advantages in such combinations from the point of view of management and administration. Economies may be effected in the staff of the distribution department, and the larger area may permit of a more efficient staff for developing the consumption of gas. These are immediate advantages; and when the time for providing more manufacturing plant is reached, it can certainly be done more economically at one works than at two, and then linking-up would be a necessity and, so far as mains are concerned, would in all probability have been anticipated. There is such a thing as "vision" in the gas industry, as in other spheres; and it is not too much to ask that full and careful consideration be given to any possible scheme that seems likely to give the advantages claimed for amalgamation.

The last word, if not the first, in these matters is with those who direct the policy of the respective undertakings; and if a good case can be made out for any particular scheme, personal considerations of whatever kind should be capable of adjustment, and ought not to stand in the way of progress. It will probably be easier to carry out such schemes where the undertakings are owned by companies than by local authorities, for reasons which are obvious.

The Hexham Gas Company.

I have not, so far, said anything about the undertaking with which the greater part of my life has been spent; and as an address of this character might be thought incomplete if no such reference was made, your patience must be further taxed. The deed of partnership which formed the first Company to supply gas in Hexham is dated Nov. 28, 1833. There were changes in the constitution of the Company from time to time, until in 1881 it became a statutory undertaking under the title of the Hexham Gas Company. At that time the annual consumption of gas was less than 9 million c.ft. When I was appointed in 1891, it had reached nearly 16 millions, since which date that figure has practically been quadrupled. This development has, of course, involved several extension schemes; and until the most recent one the original site was used for all except a gasholder and a station meter house, and in consequence the works became very congested. In 1896 additional land was acquired, and the most recent extension has been carried out thereon. As the old and new sites are only divided by a roadway, there was no serious impediment to working the old and the new works conjointly. The gasholder referred to was erected in 1898, and the retort-house and carbonizing plant, which had done service from 1883, were extended in 1899. The next stage was reached in 1920, by which time the retort bench erected in 1883 had become very inefficient, and some step was necessary to bring the plant into a condition to meet the demands made upon it. It was an unfortunate period in which to make extensions. Costs were at, or about, the peak, and only such schemes as were absolutely necessary were being carried out. To meet the requirements of the next few years, it was decided to put in a Tully plant to work in conjunction with so much of the coal gas plant as was then available. There were certain inconveniences in this arrangement, but it served the purpose for five years, by which time the cost of constructing modern plant had come down to about half the 1920 figure.

Vertical Retort Installation.

The vertical retort installation you have seen to-day was put into action in September of last year; and within 48 hours of the first charge of coal going through the retorts, the old carbonizing plant was closed down, and there has never been any indication that it would be required again. During the eleven complete months the plant has been working, the yield of therms per ton of coal carbonized has averaged 86½; and much of the coal used during the later weeks of that period has not been as good as we get in normal times. Incidentally it may be mentioned that the new plant has made a real contribution to smoke abatement. It is safe to say that less smoke is produced at the Hexham Gas-Works than in any dwelling house in the town where coal is used to even a minimum extent.

The only plant in use on the old site at present is the purification plant, a gasholder, and station governor. The capacity of the works is well above present requirements; and as the consumption increases, the manufacturing costs will be further reduced.

We have passed through these difficult times in comparative comfort; and owing to the economies effected by the new plant, we feel justified in taking the risk of not advancing the price of gas to meet the greatly increased cost of coal. We feel sure the consumers will appreciate this, together with the experience that a full supply of gas has been given throughout the whole period of the coal stoppage.

A further development we are making is that of providing up-to-date showrooms. Commodious premises, in an excellent position, have been purchased; and as soon as possession is obtained, the necessary alterations will be carried out as speedily as possible. This will put us in a position to give our consumers such advantages as are provided by the larger undertakings, and will, we believe, be a great asset in the expansion of the Company's business. The Company's stock is an investment which has found a ready market locally; and an issue which was made last year was all taken up at an average price above par value.

The undertaking is what is known as a small one; but such undertakings form a large proportion of the whole, and may be a help or a hindrance to the general prosperity of the industry. It is the desire of all concerned that it should be the former. I believe the men employed are as keenly interested in its success and as jealous for its reputation as are the Directors and staff. Altogether there is that healthy atmosphere which makes it possible to do good work.

Votes of Thanks.

Mr. T. P. Ridley (Newcastle) moved a vote of thanks to the President for his address. He said the compliment paid to Mr. Lees in making him President in the jubilee year was no idle one. It was a mark of the appreciation which the members had for the great work he had done for the industry, more particularly in that district, and for their Association. Mr. Lees had been President before. He had been Hon. Secretary for many years, also Chairman of the Commercial Section for many years; and he had the unique honour of being the first and only honorary member elected to the Association. They also knew Mr. Lees in other capacities, inasmuch as he had done excellent work in connection with the National Gas Council and the Federation of Employers. Mr. Lees had something still more to be proud of—that was the affection in which the members of the district held him. His straightforwardness, honesty of purpose, shrewd common sense, and knowledge of human frailties had endeared him to the district. No wonder Mr. Lees' Directors made him Managing Director—they appreciated what Mr. Lees had done.. Two things were essential to secure the confidence of those they served—the ability to do the work for which they were engaged, and character. Those were the two outstanding things which Mr. Lees possessed. He was an asset to the industry. They knew that Mr. Lees would give a good Presidential Address. It had covered a wide range of subjects of pressing importance, and offered them much food for thought and reflection. Mr. Lees had said that with increasing years and added responsibilities enthusiasm might wane; but he gave them a remedy. This was to cultivate the acquaintance of young men. Mr. Lees must have been in very close touch with young men all his life, because with him enthusiasm for the work and the industry had never failed.

Mr. W. W. Atley (Stockton) seconded, and said they in the North of England considered Mr. Lees the "G.O.M." of the district. As Chairman of the Special Purposes Section, they knew the true value of Mr. Lees. From passages in the Presidential Address, they would know that Mr. Lees had reconstructed the works at Hexham several times; and the culminating feature they had seen was, he thought, an education to them all. He was particularly struck with the prim and proper condition of the new works. Not only had Mr. Lees been honoured by his Directors making him Managing Director, but they had also paid a tribute to him by appointing his son as Engineer. The plant they had seen was a sound proposition, for they got 86½ therms per ton of coal. This was a very great achievement, which spoke well not only for Mr. Lees, but also for the contractors. In his Address, Mr. Lees had spoken of smoke abatement. The gas industry had a golden opportunity at the present time to make the most of that; and if they could only get sufficient publicity, it would augur well for the future of the industry. If it had not been for the gas industry generally, the country during the past three or four months would have been in a very peculiar position. He hoped they would get sufficient publicity, not only by the local organizations, but through the National Association.

The President, in acknowledgment, said he had received nothing but kindness and consideration since he became connected with the Association. It had been a great pleasure to have the members at Hexham; and he felt they had honoured him in coming in such large numbers. Apart from the meeting at Carlisle in 1922, that was the largest attendance they had had since 1914. He hoped it was the beginning of larger attendances. Regarding congratulations about the works, he said he would be doing less than his duty if he failed to emphasize the fact that for the present prim and proper condition they were indebted to the new Engineer, his son, who had put in untiring and devoted work during the past few months, to have the works in a condition of which they could be proud.

Mr. C. Dru Drury (Sunderland), proposing a vote of thanks to the Directors of the Hexham Gas Company for entertaining the Association at tea, said it was 31 years since they were last at Hexham. He was one of the few there that day who was present on the former occasion.

Mr. J. E. Blundell (Carlisle) seconded the vote, which was responded to by Mr. E. Bibson, on behalf of the Directors.

Institution of Chemical Engineers.—The annual reception by the President (Sir Frederic L. Nathan, K.B.E.) will be held on Wednesday, Nov. 3, at the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, London, at 8.30 p.m. The Royal Artillery Band will be in attendance.

WESTERN JUNIOR GAS ASSOCIATION.

Successful Inaugural Meeting.

With the opening of the 1926-27 session an addition has been made to the number of Junior Gas Associations which is assured of a cordial welcome from all those who recognize the inestimable value of the work that has been done by already existing organizations of a like character. For many years now the Junior Associations have offered help to the younger members of the gas profession in various parts of the country; and many of those connected with the technical side of the industry in the West of England have been for some time past desirous of an extension of like facilities to their area. Ultimately the desire led to action; and as the result of a meeting held in Bath a few months ago, the Western Junior Gas Association was formed, and a Provisional Council appointed.

The Provisional Council immediately got busy; and the inaugural meeting of the new Association was held last Saturday at Bristol. It was a highly encouraging start; an attendance of over fifty testifying to the cordiality with which the movement has been received. There is, too, assurance in the West of that support by the seniors which has been such a marked feature in connection with the other Junior Associations. Mr. R. Robertson, the Chief Engineer of the Bristol Gas Company, was present during the whole of the proceedings, and addressed the members; while regret at enforced absence was expressed by Mr. J. Wesley Whimster, of Bath (who has all along taken warm interest in the proposal to form the Association), and Mr. J. Taylor, of Weston-super-Mare. Meeting as the guests of the Bristol Gas Company, the members enjoyed their first visit as an Association—this being to the Stapleton Road Gas-Works, the many interesting features of which were pointed out to them by Mr. Robertson, who was assisted in this by Mr. Arthur Marsden.

Stapleton Road Works.

There are two retort houses at the Stapleton Road Gas-Works, containing two benches of 20 in. by 15 in. by 20 ft. horizontal retorts, equipped with combined De Brouwer charging-discharging machine and Drake's coke transporter; two benches consisting of sixteen settings of four Woodall-Duckham vertical retorts, 25 ft. long by 13¾ in. by 4 ft. 5 in. mean cross-section (with a waste-heat boiler); and four benches of horizontal settings operated by separate charging and discharging machines of the De Brouwer type. Coal is supplied by bucket elevator and band conveyor, and coke is delivered to De Brouwer conveyors in front of the benches, and thence by gravity bucket conveyors to the yard, where it is passed over fixed bar screens. Coke can be delivered from all benches to overhead storage hoppers, with jigging screens of the cascade type underneath, for delivering direct to rail or road trucks.

The ammonia recovery plant comprises a washer of the Livesey type and one of the Cockey pattern, with two tower scrubbers. Purification is now being carried out in two sets of four overhead ferro-concrete boxes 42 ft. 4 in. by 32 ft. 3 in. by 6 ft., with telpher plant for handling oxide. These purifiers were erected some ten years ago, on the site of an old lime shed, the roof of which was removed for the purpose.

There are two sets of turbo-blowers, one of 1,000,000 c.ft. per hour capacity for district work and pressure up to 12 in., and one of 250,000 c.ft. per hour capacity for inter-station work and pressure up to 30 in. The steam plant consists of three Lancashire boilers with forced-draught for burning breeze fuel, and one tubular waste-heat boiler on the vertical retort bench. The plant is provided with a water softener; and hot water from the condensers is used direct. Electric power is obtained by two 50 kw. and one 35 kw. generators, driven direct by gas engines.

BUSINESS MEETING.

Motor coaches which had conveyed the party to the works, were in waiting to take them back to the chief offices of the Company in Colston Street, where tea was provided by the Chairman and Directors. Sir George E. Davies, J.P. (the Chairman), had hoped to be present himself to welcome the visitors; but other engagements prevented his doing so. He, however, sent his very best wishes for the success of the new Association, as did also Mr. S. E. Halliwell (the Secretary and Commercial Manager). Mr. Robertson, in announcing this, remarked that it was unfortunate Mr. Halliwell was unable to be with them, as he had had practical experience in inaugurating ventures of this kind—having been one of the founders of the Manchester and District Junior Gas Association, which, he believed, was the first of these organizations to be formed.

After tea, the members were accommodated in the Company's handsome Board Room, for the transaction of the business—Mr. C. Bateman (of the Bath Gas Light and Coke Company), who had acted as Chairman of the Provisional Council, presiding.

Further Good Wishes.

The Chairman said he was sure that, before they considered the election of officers and the adoption of the rules which had been drawn up, they would like Mr. Robertson to address them.

Mr. Robertson remarked that he was very glad indeed to have the privilege of attending the inaugural meeting of the Association; and, in welcoming the members, he desired to associate himself very cordially with the good wishes for the success of the Association which he had already conveyed to them from the Chairman of the Company. Judging from the large gathering, the Association could confidently look forward to a prosperous career. It was a great satisfaction to him that the Association had been formed. It had been a want that many of them had felt for a long time past, and which had often been talked about. The Association would undoubtedly serve a very useful purpose, because the industry with which they were all connected had never before been faced with so many urgent problems as was the case at the present time. The more they knew about their business, the more they found there was to know. Another element which had to be considered was the competition which day by day became keener and keener. If the prestige of the gas industry was to be maintained, it would only be by each one of those connected with it "doing his bit." An Association of the kind they were now forming could be extremely helpful. It would afford ample opportunity for the discussion of practical problems and the interchange of experiences and views, and incidentally it would bring about a certain amount of competitive zeal which would be valuable. Once more he heartily welcomed them to Bristol, and expressed the sincere wish that the Association would have a long and successful existence.

The Chairman, proposing a vote of thanks to Mr. Robertson for the kindly manner in which he had received them and for the encouraging remarks he had made, said the juniors had formed the Association themselves, but they would have to rely upon the seniors—the chief engineers of the larger works—to keep things going. With such support as they had that day enjoyed, he felt confident that the future would be full of success. They had already more than fifty members. The necessity for such an Association in their district had been long felt. When he came from Cardiff, he asked one or two members from Bristol and Bath whether they would join the Wales and Monmouthshire Junior Association; and then once more the question came up of the advisability of forming an Association for the West of England. The result was the meeting at Bath, at which the Provisional Council was formed. He included in the vote of thanks the Chairman and Directors of the Bristol Gas Company, who had manifested such kindly interest in the new venture.

Mr. S. S. Lloyd (Weston-super-Mare) seconded the vote, which was heartily accorded.

Office-Bearers.

The Chairman remarked that the Provisional Council had suggested nominations for the various offices in the Association; but, when doing so, they had circulated a list of members, and intimated that any other names might be substituted for those proposed by the Council.

On a ballot, the following officers and Council were appointed:

President.—Mr. C. Bateman, of Bath.
Senior Vice-President.—Mr. Arthur Marsden, of Bristol.
Junior Vice-President.—Mr. T. B. Armitage, of Cheltenham.
Hon. Secretary.—Mr. George C. Gunston, of Bristol.
Hon. Treasurer.—Mr. E. Evans, of Gloucester.
Hon. Auditors.—Messrs. F. J. Marlow, of Weston-super-Mare, and Harry W. Randall, of Stroud.
Members of Council.—Messrs. S. Hole, of Bath; A. Barrett, of Frome; J. Conway, of Bristol; S. S. Lloyd, of Weston-super-Mare; J. T. Spencer, of Weston-super-Mare; and a member from Exeter, to be appointed later.

Programme.

The Chairman asked for suggestions for the programme for the ensuing session, and said it was his intention to approach the President of the Institution of Gas Engineers, and ask him if he would come down and start the Association on its career. If the President of the Institution consented to address the first formal meeting, they could postpone their own Presidential Address to a later meeting of the session—possibly the final one. Another meeting might take the form of a visit to Beckton.

These suggestions were approved by the members present.

Rules.

The rules that had been drawn up were adopted by the meeting. These contained the following:

Qualification for Membership.

(*a*) *Honorary Members.*—Honorary members may be elected by the Council, but shall not be persons engaged in the manufacture of gas appliances. They may take part in the reading of papers, discussions, &c., but may not hold office or take part in any voting.

(*b*) *Ordinary Members.*—Ordinary membership is open to any person holding a recognized position, and who is engaged at a

gas-works, coke oven, or power gas works, or at a works dealing with working-up of gas-works residual products, or otherwise associated with gas manufacture or distribution, but who is not engaged in the manufacture or sale of material or appliances used in the gas industry. Membership is also open to the scientific staffs of the Universities and Technical Colleges in the Association's area.

(c) *Student Members.*—All appliancts under the age of 21 years shall, their qualifications being approved by the Council, be accepted as student members, but must on attaining that age apply for ordinary membership.

SUBSCRIPTION.

The subscription shall be a maximum of 10s. per annum, which may be reduced at the discretion of the Council. This amount is payable, in advance on election, to the Hon. Treasurer, and on each succeeding 1st of January, and is to include a copy of the "Joint Transactions."

The fee for student membership shall be 5s. per annum, payable as before mentioned, not, however, to include a copy of the "Joint Transactions."

A vote of thanks for the admirable manner in which they had performed a difficult task was accorded the Provisional Council, on the proposition of Mr. LAWRENCE, seconded by Mr. ALLEN.

The CHAIRMAN, returning thanks, expressed his gratification at the success which had attended the labours of the Provisional Council.

The new Association are, of course, encroaching on the London and Southern District Junior Gas Association's area; but this matter has now been satisfactorily arranged with them.

WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.

GENERAL MEETING AT PORTHCAWL.

A meeting of the Institution was held on Tuesday, Oct. 5, in the Council Chamber, Porthcawl, with the President, Mr. H. D. MADDEN, of Cardiff, in the chair. There was an attendance of about fifty, which included the Chairman and a number of members of the Urban District Council, together with Mr. Walter Dunn, the Secretary of the Institution of Gas Engineers. Mr. C. Bateman, the President of the Wales and Monmouthshire Junior Gas Association, was also present, with some of the members of his Association.

A WELCOME.

Mr. J. E. DAVIES, J.P. (the Chairman of the Urban District Council), in extending a hearty welcome to the visitors, said they were always glad to see the Institution in Porthcawl, and hoped they would continue to come year by year. On behalf of the Council, he expressed the hope that the meeting might prove to be mutually advantageous. He himself had spent a year at Cardiff, and the experience he had thus gained had proved of the utmost value to him as a member of the Gas Committee.

Mr. J. E. WILLIAMS (the Chairman of the Gas Committee) associated himself with the welcome, as did also Mr. EVAN DAVIES (the Clerk to the Council).

The PRESIDENT acknowledged the welcome.

THE MINUTES.

The HON. SECRETARY (Mr. Octavius Thomas, of Pentre) read the minutes of the last general and special meetings, and they were confirmed. He also notified the receipt of apologies for absence from Presidents and Secretaries of various kindred Associations.

NEW MEMBERS.

On the proposition of Mr. A. G. LOFTHOUSE (Pontardawe), seconded by Mr. A. T. KYLE (Abergavenny), the following new members were elected:

Mr. Samuel Hall, Engineer and Manager of the Builth Gas-Works.
Mr. Robert Harle, Manager of the Beaufort Gas-Works.
Mr. Thomas Huntley, Technical Assistant to the Cardiff Gas Light Company.

The PRESIDENT expressed the gratification of the Council at the fact that the new members coming along possessed qualifications which would prove a source of strength to the Institution.

AN HONORARY MEMBER.

Mr. J. H. CANNING (Newport) said it was not only a pleasure, but he considered it a privilege, to have the opportunity of proposing that his friend Mr. R. J. Auckland be elected an honorary member of the Institution, in recognition of valuable services rendered to that body. His good qualities were known to all of them, as also were his many kindnesses, not only to the Institution as a whole, but to individual members. Honorary membership of the Institution was not accorded lavishly or indiscriminately. There were very few of them; and those few thoroughly deserved the honour—not the least in this respect being Mr. Auckland.

Mr. THOMAS seconded, with the remark that he had known Mr. Auckland for a good many years, and he was certainly fully deserving of the honour which it was proposed to confer upon him.

The PRESIDENT said that, had Mr. Auckland been present at the Council meeting when this matter was discussed, he would have been pleased at the terms in which the proposal was referred to. He had been acquainted with him for twenty years; and the longer he knew him, the better he liked him. He was far more than a colleague in Cardiff; he was a personal friend.

Mr. A. E. DAVEY (Aberdare) said that, as an old Cardiff Gas Company's employee over thirty years ago, he had worked with Mr. Auckland; and he had been delighted to witness that gentleman's progress in the Company's service. A good many of them who were with the Company at that time had left; but Mr. Auckland had stuck to the old ship, and it had proved to be not to his disadvantage.

The proposal having been carried by acclamation,

Mr. R. J. AUCKLAND (Cardiff) expressed his thanks for the signal honour that had thus been done him. Any little things he had been able to do, he said, had not been at all commensurate with this honour; but in his new position he hoped to be able to render greater service both to the Institution and to the industry which it was the duty of all of them to serve to the best of their ability.

PRIZES FOR THE JUNIORS.

The PRESIDENT said he thought the Institution could fairly claim some little credit for having tried to encourage in every way the members of the South Wales Junior Association, not only in the matter of its formation, but in regard to studies and classes. He would like to refer specially to the classes at the College which Mr. J. Mogford (of Cardiff) had so ably conducted for gas engineering, while Mr. B. J. Bell (of Cardiff), who he was sorry to say was absent through illness, had looked after the gas supply side. There were also various other subjects dealt with. In awarding prizes, they were not governed altogether by examination results; it was character also which they wished to develop. What they were doing in this matter was really sectional work for the big Institution in London; and he was pleased to announce that the Secretary of the Institution of Gas Engineers had kindly undertaken to present the prizes to the juniors who had won them.

Mr. WALTER T. DUNN expressed his pleasure at being present at the meeting, and said he was the bearer from the President and Council of the Institution of Gas Engineers of their greetings and best wishes for the continued success of the Wales Institution. He congratulated the prize-winners, and said the industry much appreciated what was being done in Wales in this matter. Everything possible should be done to encourage those who were coming along; for they would have to carry the flag, and the better they were equipped for the task the better would it be for the industry. He then distributed the prizes, as follows:

In appreciation of work done for the Wales and Monmouthshire Junior Gas Association.

Mr. T. A. CANNING . . .	"Administration and Finance of Gas Undertakings."
	"Manufacture of Sulphate of Ammonia."
Mr. T. V. BLAKE	Case of drawing instruments.
Mr. C. BATEMAN	"Gasholders."
Mr. J. WOOD	"Scientific Promotion of Gas Sales."
Mr. G. H. G. HUGHES . .	"Competition Points for Gas Salesmen."
	"Gas Meters."
	"Self-Instruction in Gas Supply (Advanced)."
Mr. R. J. WILLIAMS . . .	"Coke and its Uses."

In recognition of having passed the Higher Grade in Gas Engineering, First Class.

Mr. T. HUNTLEY	Drawing instruments.

In recognition of having passed the Ordinary Grade in Gas Engineering, First Class.

Mr. L. L. KLEIST	"Analysis of Coal and its Bye-Products."
Mr. T. H. MADDEN . . .	"Sulphate of Ammonia."
Mr. C. R. MONROE . . .	"Ammonia Stills."
Mr. A. C. PARKER . . .	"Steam Engines, Gas and Oil Engines."
Mr. J. H. WILLIAMS . . .	"Self-Instruction in Gas Engineering (Advanced)."

In recognition of having passed the Cardiff Technical College Official (Internal) Examination in Gas Manufacture, First Class.

Mr. G. A. Mogford . . . "Manual of Chemical Analysis."
"Qualitative Organic Analysis."
Mr. H. V. Williams . . . "Self-Instruction in Gas Engineering (Advanced)."
Mr. R. M. Warren . . . "Self-Instruction in Gas Engineering (Advanced)."
Mr. W. T. Lane . . . . "Manual of Chemical Analysis."
"Qualitative Organic Analysis."

In recognition of having passed the Cardiff Technical College Official (Internal) Examination in Gas Supply, Grade II., First Class.

Mr. L. K. A. Cox . . . "Practical Physics."
Mr. J. Burt . . . . . "Competition Points for Gas Salesmen."
"Elements of Illuminating Engineering."
Mr. D. Livingstone . . . "Competition Points for Gas Salesmen."
"Elements of Illuminating Engineering."
Mr. D. Bourdice . . . . "Competition Points for Gas Salesmen."
"Elements of Illuminating Engineering."

Annual Report and Accounts.

In their twenty-first annual report, the Council stated that the number of members on the roll at April, 1926, was 74, together with 8 students and 2 honorary members. The receipts for the year amounted to £78 7s. and the payments to £87 3s. 6d., leaving with the balance brought forward from the previous year the sum of £34 5s. 8d. in the hands of the Treasurer, and £100 of 2½ p.ct. Consols.

The report and accounts were adopted, on the proposition of Mr. Auckland (who remarked on their satisfactory character), seconded by Mr. B. Grainger (Caerphilly).

New President.

The President said they had now to consider the election of a new occupant of the chair, and it was a particular pleasure to him to put forward the recommendation of the Council that the new President be Mr. A. T. Kyle, of Abergavenny. Mr. Kyle was one of the early members of the Institution, and had done excellent work.

Mr. W. Clark Jackson (Neath) remarked that he had no misgiving whatever in seconding this proposal.

Mr. Kyle, in acknowledgment, asked for the loyal support of all in carrying out the duties of the office.

List of Office-Bearers.

The following is the list of new officers appointed for the ensuing year:

President.—Mr. A. T. Kyle, of Abergavenny.
Vice-President.—Mr. D. W. Davies, of Tredegar.
New Members of Council.—Mr. W. Collin, of Bridgend, and Mr. F. Boardman, of Cardiff.
Hon. Treasurer.—Mr. J. H. Canning, of Newport.
Hon. Secretary.—Mr. Octavius Thomas, of Pentre.
Hon. Auditors.—Mr. J. H. Jones, of Dowlais, and Mr. A. E. Davey, of Aberdare.

Mr. Canning, returning thanks for his re-appointment as Treasurer, remarked upon the strong financial position occupied by the Institution, more especially in the direction of invested funds It was this fact which enabled them to encourage the juniors in the manner which had been witnessed that day.

The President, proposing the re-election of the Hon. Secretary, said Mr. Thomas had been a friend to all, and his friendship had left its mark upon the lives of most of them.

Thanks of the Juniors.

Mr. C. Bateman (President of the Wales and Monmouthshire Junior Gas Association) thanked the Institution for their encouragement, and Mr. Dunn for the interest he had shown in the matter.

Mr. J. Mogford (Cardiff) said there was no doubt that such encouragement would lead the students on from success to success. There had been difficulty in getting the students together, and in carrying on the classes strictly in accordance with the rules laid down by the parent Institution. These rules would undoubtedly bring forward men who would be capable of carrying the flag, as Mr. Dunn had expressed it; but in the initial stage they in South Wales had found that, in order to make up a successful class, it was necessary to take the students as they came along. There were students possessing various qualifications; and difficulty was experienced in getting the team together. Taking them as they came along, however, there was nothing to do but to begin at the beginning. He thought the classes had been an absolute success. The students were very keen; and those who took the Institution examination had come out very well. Then the Cardiff Technical College had an examination, a paper being set which was quite as difficult as the Institution one; and the remaining students came successfully through this. He looked for still better results from the classes as time went on.

Institution Benevolent Fund.

The President proposed, and it was agreed, that the usual contribution be made to the Benevolent Fund of the Institution of Gas Engineers. At the same time, he urged members to subscribe individually to the fund, which was in need of all the support it could get, and deserving of every contribution that could be made to it.

Mr. Thomas also appealed for individual subscriptions to the fund.

Representative on the Parent Council.

On the motion of Mr. D. W. Davies (Tredegar), seconded by Mr. Jackson, Mr. Kyle, the new President, was appointed to represent the Institution on the Council of the Institution of Gas Engineers..

The following paper was then read:

A PLAIN TALE FROM THE HILLS—AN UPLIFTING STORY.

By J. Stephenson, of Ferndale.

There are two things which I feel I ought to endeavour to justify. The first is my appearance in my present rôle, and the second is the title of my paper.

Regarding the first, I can assure you that it is much against my will, and with the distinct feeling that what I can say is not of sufficient general interest to be worth saying on an occasion like this. I have always considered myself fortunate in having as my next-door neighbour our Secretary, Mr. Octavius Thomas, but I perceive now that there are disadvantages to this, as in the present case, where his knowledge of our doings, and his inability to prevail on people with better material and greater ability to read a paper at this meeting, led him to put such pressure on me that in a weak moment I consented to do his bidding. These few remarks will enable you to lay the responsibility on the right shoulders.

I will now deal with the title of my paper—"A Plain Tale from the Hills." The Ferndale Gas Company supply three towns or villages—Tylorstown, Ferndale, and Maerdy—situated in the Rhondda Fach Valley and having a population of about 30,000 inhabitants, who for the most part are engaged in the mining industry, and consequently receive in normal times a monthly supply of coal at the mere cost of the haulage. This tells heavily against the development of gas for cooking and heating; and the majority of our consumers are small lighting customers. The district may fairly be said to be among the hills, as the three towns are strung out through a narrow valley; the main road being at the lower end of the district 500 ft. above sea level, and at the upper end 1000 ft. The railway and a small rapidly running river lie in the bottom of the valley, and the hills rise steeply at each side; there being practically no level ground.

What I have to tell you is a plain tale of recent happenings in this district—a narration of facts for which I claim no technical merit, though the recital may serve to make those of you whose work lies away from a colliery district more contented with your lot, and may establish a feeling of fellowship with those who find themselves in similar circumstances and who never known from day to day what may happen on their works or on the district, owing to the effects of colliery workings.

Leakage.

In the gas supply area of my own Company there are ten pits, from which millions of tons of coal have been removed. In districts such as this, leakage, as you know, is a continual bugbear, with drawn joints and broken mains practically weekly occurrences. Many of you know that sinking feeling which you get in sympathy with your holder when, instead of finding your stock of gas increasing as it ought at a critical time, it is rapidly decreasing, and no effort in the retort house appears to stay the downward course of the holder. You have probably, as I have, sent men in various directions throughout the district, and, having eventually found a broken main, have been told by a consumer: "We were afraid to sleep in the front bedroom last night, because the smell of gas was so strong. I thought once of sending to tell you about it."

I find that I am digressing to some extent from the lines I laid down for myself; but to us the question of leakage is of great importance. Leakages such as the one referred to, though a source of anxiety, are marked, and as a rule are comparatively easy to remedy. The leakage which is most insidious in its action and which entails most work and trouble is that which occurs from drawn joints and is spread over a considerable area. Within the last fortnight I have dealt with a case of this kind, where, by opening the ground and caulking joints, I have reduced the leakage in a district by 70 c.ft. per hour. Assuming this rate of leakage to have been constant, this means a saving of over 600,000 c.ft. per annum.

An Anti-Leak Clip.

We have derived great benefit from the use of a device patented by one of my predecessors at Ferndale. This is a clip attached to the socket of a main, and holding an indiarubber band tight against the joint. We have found these clips very

effective. On many occasions we have taken them off after years of use, and have found the joint drawn, and gas leaking, though before disturbing the clip there was no leak whatever. We now put these on whenever we find a joint which has not previously been fitted; and we have used thirty of them in the district of which I have just spoken.

We are fortunate in that our works are situated on the pit pillar—that is, the solid portion which surrounds a pit shaft for a considerable distance, and, apart from roads driven through, is left unworked, to protect the shaft and surface works of the colliery. This applies to the whole of our works except the gasholder, which is a short distance from the plant, across the river.

Subsidence and the Holder.

Early in 1925 a fracture occurred in the 15-in. main from the works to the holder, which came as a shock, and led to investigations being made which disclosed the fact that a movement had taken place in the ground, and the holder had sunk at one side.

I should explain that our storage capacity consists of two cylindrical receivers for the storage of gas under pressure, and a two-lift holder in a steel tank 62 ft. in diameter by 18 ft. deep, with lattice columns and guide framing. The tank is built on a concrete raft foundation, 1 ft. 9 in. thick, containing two layers of expanded metal reinforcement. It is accessible all the way round.

By April the movement had become so pronounced that the tank was 4¼ in. out of level. We were therefore faced with the problem of how to remedy the defect. It was obvious that the movement might continue, either at an increasing rate or more slowly; and the question we had to decide was whether anything should be done during the summer to obviate risk of a serious breakdown during the winter—for, in the event of anything happening to render the holder unworkable, the high-pressure receivers would be useless, as they were dependent on a reservoir to draw from before compressing. The charts from a pressure register on the holder outlet showed no signs of trouble, and were steady and normal.

From this time, observations and measurements were made frequently. The distance between the water level and the top of the tank was measured regularly at each column, and recorded; and plumb lines were dropped from the top curb of the tank near each column, so that, in addition to knowing how much the tank was out of level on a direct line, we could also ascertain any distortion of the walls of the tank, as it was obvious that this might be sufficiently great to be a serious menace.

Conditions become Worse.

The condition of the holder gradually became worse. By the beginning of September it was 6¼ in. out of level, and by the middle of October 7¼ in.; but it was decided that we would take the risk of going through the winter, and there were times when the movement appeared to be abating. On Easter Monday of this year, however, I was called to the works urgently, and found the seal in the cup blowing. There was a fountain about 15 ft. high, and the inner lift was just about to enter the water in the tank. We had lost five sheets of gas, and the holder had run down smoothly. Early that morning a slight earthquake shock had been felt in the district; and to this I attribute the extra movement which, with the fresh breeze blowing on that day, led to the unsealing of the inner lift.

Our position then was that our holder capacity was reduced by half, as we were able to use only one lift; and the tank was 10¾ in. out of level. Of course, the two lifts could have been used by putting a fender round the grip of the outer lift, and thus increasing the amount of seal; but the time of the year made it possible for us to maintain the supply of gas with the restricted storage accommodation, and it was felt that the time had now definitely come when arrangements must be made to put the holder into a sound and safe condition.

Work of Re-levelling.

The provision of a new holder was contemplated, for use while the existing one was being re-levelled; but as there was no ground available which would not be subject to the same trouble, and having regard to the unsettled state of affairs in colliery districts, it was decided to proceed with the re-levelling during the long days of summer. Our thoughts were directed at first to the practicability of reducing the water in the tank to a low level, thereby ensuring a limited storage accommodation while the work was proceeding. We decided, however, that this was unwise, as we should have to content ourselves with raising the rim of the tank, leaving a big sag in the bottom plates, which would impose a great strain. After giving the matter serious consideration, it was decided to discontinue the supply of gas to the district, empty the tank of water, and re-level it throughout.

My Company is fortunate in having on its Board of Directors gentlemen of great engineering ability and experience connected with the local Colliery Company; and they were able to place the resources of the Colliery Company at our disposal. They gave much thought to the method to be adopted in overcoming the difficulties of the situation. The successful conclusion to which the work was brought was entirely due to this careful planning beforehand of all detail, and the thorough preparation made before starting the job.

The Remedy.

The method of lifting the rim of the tank was simple. Holes were to be cut in the concrete foundation at intervals round the tank, to receive hydraulic jacks. It was also desired to level the bottom plates of the tank at the time the edge was raised; and several methods of doing this were discussed. As an instance, we considered at one time whether it would be possible to insert a number of bolts in the bottom sheets, and tie these by rods to the roof trussing, so that the jacks round the edge would then lift the whole structure bodily. On working out the strength of the roof trussing, however, and the strains which would be imposed on it, we found this to be impracticable. In considering the question of raising the bottom plate, we were always worried to some extent by the fact that the tank rested on a layer of sand and tar on its concrete bed, and the amount of resistance due to "stiction" was an unknown factor.

The method eventually decided on was this. Thirty-two 3½-in. holes were to be cut in the bottom plates of the tank, spaced in two concentric circles. Through these holes, cast-iron discs with a recess in the centre were to be placed, and the holes covered with flanges fastened to the plates by four ⅝ in. studs. These flanges were drilled and tapped to receive 1¼-in. eyebolts of a length greater than the maximum amount of lift required, the lower end of which fitted the recess in the cast-iron discs. The idea was to screw-down the eyebolts; the discs providing a foot to prevent their cutting into the foundations. As the bolts were screwed-down, the bottom plate would, of course, rise.

Our plan after raising the tank was to push a stiff concrete (consisting of cement, sand, and chippings) underneath, to a distance of about 8 ft., by rammers; and having thus formed a barrier the whole of the way round, to run in from the inside a thin concrete consisting of sand and cement. This could be done by uncovering some of the 3½-in. holes, and adopting means to ensure that the plates did not sink at those places when this was done.

Cessation of Supply.

Notice was given to our consumers that the supply of gas would be discontinued on July 25, and that it was hoped to resume in about ten days. At 8 a.m., therefore, on Sunday, July 25, the valves were closed, the small amount of gas remaining in the holder was blown away through the crown, and the holder safely landed. A supply of compressed air which was available was connected to a cock in the crown, the holder was raised a sheet, and lowered twice, so that the residual gas in the crown was cleared out. We then commenced emptying the tank, having to deal with about 1500 tons of water.

A 4-in. pump had been connected, and two 3-in. syphons had been put in the tank, which acted splendidly. While the water was being dealt with, the 15-in. inlet and outlet pipes were cut, and the branches removed from the syphon pots. These pipes required lining-up, for, owing to the subsidence, the vertical pipes had canted-over towards the holder. The tank was emptied by Monday morning; and the rest of the day was occupied in cleaning it out and marking positions for the flanges, which were somewhat modified to deal more suitably with the extra weight round the inlet and outlet pipes and the centre pillar.

During Monday night, 128 ⅝-in. holes were drilled and tapped for the studs to secure the flanges. Pneumatic drills were used for this purpose. On Tuesday the 32 3½-in. holes were cut by oxy-acetylene flame, and the flanges and bolts placed in position. On Wednesday morning the jacks were placed in position—eight 60-ton hydraulic ship jacks being used—and the lifting was commenced.

It had been decided to raise the holder 13 in. at the lowest point—that is, 1¾ in. more than required to bring it level—and the proportionate amount of lift at each column had been calculated. The measurements were carefully watched so that no strain was imposed by any jack being worked faster than required. As the lifting of the rim was being carried out, the screws inside the holder were being screwed-down. Rests were made at intervals to allow us to check the levels inside, and by noon the lifting was completed, the edges were packed up, and the bottom plate was levelled.

Concreting started immediately, and was continued day and night until completed. This was done, the flanges were made tight, the bolts removed, and the holes plugged, by Sunday morning. The re-filling of the tank with water was started at once. In the meantime the inlet and outlet pipes had been lined-up and re-connected. The manhole covers were replaced, and gas-making commenced again on Monday morning. Great care was taken in scavenging the plant and the crown of the holder, as we were anxious to get a satisfactory quality of gas to our consumers at the earliest moment, and we knew that the distributing mains in a district like ours must be full of air.

During the time the work was in progress, our outside men

visited all our consumers, and closed the main taps; and all consumers were circularized, and warned not to turn on their taps until notice of resumption of supply had been given to them.

The Work Completed.

With the object of helping to clear the mains, I turned gas on to the district at 10 o'clock on the Monday night. Tylorstown is fed by an 8-in. main, and Ferndale and Maerdy by a 15-in. main, and, on account of the varying levels, through separate governors. It was evident that things were satisfactory on the Tylorstown main, because the governor bell rose to the top. The Ferndale governor, however, did not respond in the same way; and it was soon discovered that there was a serious leak in the 15-in. trunk main. The gas was therefore turned-off this section; and immediately it became daylight on the Tuesday morning investigations were made, and we eventually found that the main was broken in a very awkward position. By working throughout that day and night, we remedied this, and got gas through the following morning.

Our Tylorstown consumers were, therefore, without gas for nine days, and our other consumers for ten days; and we had the satisfaction of completing the work, and doing a thoroughly good job, within the time which we had estimated.

Discussion.

The President said they had had what was really a plain tale excellently told. The author was to be complimented both on his paper and on the method by which he had tackled a very awkward situation. Such a position as that in which the author had found himself must have caused him the greatest anxiety. In fact, it should have been enough to turn his hair grey. The means he had adopted were not only applicable to this particular situation, but provided valuable data for every one. This was just the type of paper that they in South Wales needed more than any other. It gave them a chance of really understanding the difficulties encountered "up in the hills." He congratulated Mr. Stephenson on the way in which the whole thing was carried out. It was an engineering feat of which one might well be proud. He asked for further information regarding the portion of the work on which oxy-acetylene was employed.

Mr. J. H. Canning (Newport) also welcomed this practical record of difficulties so well overcome. The author and his Directors were to be congratulated upon taking the bold course of shutting-off the gas for a time, so as to enable the trouble to be rectified. They all knew that the danger in a district such as Mr. Stephenson's was unequal settlement of the ground due to mine working; and the only really radical method of obviating this was to purchase the mineral rights. This had to be done over a considerable area, and before the coal was worked, so that it was a very expensive procedure. It was done in connection with great engineering works, but was usually out of the question in respect of the structures erected on gas-works. It was unequal settlement that caused the trouble, because this resulted in tilting. It was clear from the paper that in this case tilting took place to a considerable extent. The next stage, if the settlement was very unequal and prolonged, might be fracture; and he would like to hear from the author whether fracture of the foundation did actually occur in this instance. Tilting, although it interfered with the functioning of a gasholder, did not usually actually distort it or impose upon it strains of great magnitude; but fracture would cause distortion, and possibly finally the destruction of the holder. It was impossible to put in a foundation which would be fracture-proof. The forces involved were so gigantic, and so incalculable, that he did not think any engineer could put in a foundation that would be absolutely certain to stand up to any conditions which might be experienced; but it would be of advantage to others to know whether the foundation in this case was able to withstand without fracture the strain imposed upon it. There was another matter of interest referred to in the paper of which he (the speaker) happened to have had experience. This was the anti-leak clip. Some years ago he had had difficulty with a steel high-pressure main, which was exposed to great vibration through heavy traffic.

The President: What was the pressure?

Mr. Canning replied that the maximum was 7½ lbs. per sq. in. The difficulty occurred where the main had unavoidably a shallow covering, owing to the presence of other pipes beneath. The traffic being of a particularly heavy nature, the joints were continually shaking loose, and this meant a great deal of attention, and consequent expense. However, he heard of the clip to which Mr. Stephenson had referred, and attached it to the worst of the joints; and the results had exceeded his expectations. The clip kept the joints tight, and obviated to a great extent the difficulty that had previously been experienced. He hoped that other members of the Institution who had been faced with troubles in the way that Mr. Stephenson had would come forward and relate them, so that knowledge might be pooled, to the advantage of all.

Mr. J. Mogford (Cardiff) expressed the opinion that the author had carried out the job in an admirable manner. He (the speaker) was in the habit of visiting Ferndale occasionally, and thus had had the opportunity of becoming acquainted with the trouble there, and of watching its development. There was no alarm or excitement, such as would have been likely to turn Mr. Stephenson's hair grey, as the President had remarked. The first time he went along, he was told quietly that there was something wrong with the holder. His attention was also drawn to a crack in the boundary wall, which on subsequent visits he found to be growing wider and wider. Mr. Stephenson told him he was taking measurements; and apparently he was calmly watching his only holder going over into the river. The measurements were carefully taken over a lengthy period; and when the time arrived to take definite steps, there was still no excitement. Everything was accurately calculated, the plant was got together, and the men were organized—just as an experienced mechanical engineer might be expected to prepare for such a job. Even the time the work was going to take was closely calculated; and the whole thing went along absolutely to programme. The time table for all the operations was strictly adhered to. What had struck him most during his visits was the modesty of the man in charge of the work. The difficulties that gas engineers encountered in these valleys might surprise men who were not engaged in mining areas. The entire success of the scheme was due to "stiction"—to use a word the author employed in his paper—on the part of the men who carried it out.

Mr. A. E. Davey (Aberdare) said he had two or three holders which had given him a great deal of trouble, though not to the extent that Mr. Stephenson had experienced. He (the speaker) had also cracks in his walls and in the retort benches, and had found trouble in maintaining even seals. His undertaking certainly had done what Mr. Canning suggested; the works being on pillars of coal. But he felt that the colliery must be worked fairly close. He had a holder which was 11 in. out of level; and some time ago there were purifiers which were 11½ in. out. They had, however, put in a new set of purifiers on a superstructure. The old ones were water sealed; but the new set was of the luteless type. Thus that difficulty had been overcome. Being in a similar district, he could keenly appreciate all that Mr. Stephenson had gone through.

The President remarked that Mr. Stephenson had displayed that resourcefulness which should be the attribute of every engineer.

Mr. Stephenson, replying to points raised in the discussion, said he had, in the first instance, been worried a good deal about the oxy-acetylene flame in the holder, because the holder was to be opened out, and the work had to be done quickly, and there was the question of the atmosphere inside to be faced. He took very great care to clear the holder before the water level was reduced at all. Then when all the water possible had been taken out, he went down, and was surprised to find how fresh the air was. A day after this he had no hesitation in allowing the oxy-acetylene plant to be placed inside the holder. No definite trace of any fracture could be found in the foundation; and he did not think there actually was a fracture. The works were on a coal pillar; but the holder was just off it. The side of the holder nearest the pillar held up, and the side that was away from it went down, as one would naturally expect.

Mr. W. Clark Jackson (Neath), in proposing a vote of thanks to the author, said that what had struck him about the paper was the organized brain behind the job. Everything had been carefully calculated out before a start was made with the work. This was the outstanding feature of the paper.

Mr. W. H. Johns (Swansea), who seconded the vote, remarked on the practical nature of the paper, and expressed a hope that they might have others like it. He believed Mr. Thomas had experienced trouble of a like character in the Rhondda, and suggested that he might one day tell them how he got over his difficulties with cast-iron tanks and similar structures, which might have to be dealt with in a different manner.

Place of Next Meeting.

Mr. Kyle said he was the bearer of an invitation from his Council to the Institution to visit Abergavenny for the next May meeting. He assured the members that they would have a hearty welcome.

The invitation was accepted; and the meeting closed with a vote of thanks to the Porthcawl Urban District Council for the use of the Council Chamber.

Luncheon.

Subsequently a party of between sixty and seventy sat down to luncheon in the Pier Hotel. Mr. Madden was in the chair, and submitted the Loyal Toast, after which Mr. Jackson proposed "The Porthcawl Urban District Council," and this was replied to by Mr. J. E. Davies (the Chairman), who assured the members of the same hearty welcome on the occasion of future visits that they had received that day. Mr. W. G. Griffin was responsible for the toast of "The Continued Success of the Institution," and expressed his pleasure (as an old schoolmaster) at the encouragement that was being given to the younger men of the profession. Mr. Madden, in reply, said the success of the Institution had been due to the strong bonds of fellowship existing between the members. It was the aim of the Institution to encourage the juniors in every way to do their best and to acquire all possible knowledge. It was the duty of all who had charge of gas undertakings to assist in the preparation of the juniors to carry on the work.

In the afternoon, members held their first annual golf meeting at the Royal Porthcawl Golf Club, when, by medal play, they competed for a cup. Below are the details:

R. J. Auckland (Radyr)	87 − 8 = 79
Stanley Johns (Porthcawl)	85 − 5 = 80
J. King (Cardiff)	98 − 14 = 84
W. C Jackson (Neath)	90 − 5 = 85
R. J. Upjohn (Birmingham)	105 − 20 = 85
E. S. Allen (Newport)	104 − 17 = 87
J. Sadler (Newport)	101 − 13 = 88
J. P. Jones (Caerphilly)	106 − 18 = 88
W. Shirely (Porthcawl)	106 − 18 = 88
W. R. Richardson (Cardiff)	114 − 24 = 90
B. Graniger (Caerphilly)	110 − 18 = 92

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Annual Meeting.

The Annual Meeting of the Association took place at Bury, on Saturday, Oct. 9, when about a hundred members assembled at the gas-works main office, and were received by the Gas Engineer (Mr. H. Simmonds) and the Chairman (Alderman F. Bradley), together with Aldermen Lees, Smith, and Rothwell, and Councillors Eastham, Lord, and Hall, and the President of the Association (Mr. W. H. Battersby).

Description of the Works.

The annual make is 520 million c.ft.

Coal Handling Plant.—The coal is brought to the works from the siding by the Department's locomotives, where it is emptied into a coal breaker, and broken into small pieces. It is then elevated by a bucket conveyor to a band conveyor (576 ft. long) provided with a throw-off carriage, which enables the coal to be stored in any part of the stores. A stock of about 6000 tons is usually carried, which is equal to about one month's consumption in the depth of winter. As required, the coal is conveyed from the stores, by bucket and push-plate conveyors, into overhead bunkers in the retort house.

Carbonizing Plant.—No. 1 retort house contains twelve beds of horizontal retorts, D, 22 in. by 16 in., charged and discharged by a De Brouwer complete stoker, which is electrically driven. The gas-making capacity of this house is 1,500,000 c.ft. per day.

No. 2 retort house consists of five beds of Glover-West vertical retorts, which were completed in 1921, and have a gas-making capacity of 2 million c.ft. per day.

During the last four years 90 p.ct. of the gas has been made in Glover-West verticals.

De Brouwer Coke Conveyors.—The coke, on being discharged from the retorts, is carried by these conveyors from the retort house to storage hoppers, railway wagons, or the coke yard, as required.

The sulphate of ammonia plant has a capacity of 3 tons of neutral dry salt per day. For the convenience of the small gardener and allotment holder, 7-lb. cartons are sold at the Broad Street showrooms.

The holder capacity is 2 million c.ft.

The mechanics' shop is furnished with a lathe, drilling machine, punching and shearing machine, power hack-saw, blacksmith's hearth, &c. The machinery is driven by a 10-H.P. "National" gas engine.

The works are complete with a coal-testing plant; and the laboratory is provided with all the latest forms of testing apparatus.

Railway Sidings.—The sidings were constructed in 1892, and in addition to dealing with the gas-works traffic, are used as public sidings. The traffic dealt with during the last twelve months was about 63,000 tons, of which 40,000 tons was the Gas Department's own traffic.

Tar Distillery.—The tar is pumped up from the gas-works to the tar works, where it is subjected to fractional distillation. The still capacity is 15 tons.

At Tea.

Tea was provided at the Derby Hotel by the Gas Committee, and at its conclusion Mr. H. P. Lupton (Liverpool) moved a vote of thanks to the Mayor, Gas Committee, and Gas Engineer for the privilege of visiting the works, and for their kind hospitality. Mr. Williams (Crewe) seconded, and expressed, on behalf of the Association, their appreciation of the presence of the Mayor. In reply, Alderman Bradley said he had been much gratified by the large attendance. He was very proud of their gas undertaking, which had always made good profits. He was also proud of the Engineer, and of the staff who worked along with him. The Gas Committee was glad to know that a member of their staff had been elected President of the Association. Mr. Simmonds also expressed his pleasure at seeing so large a number of members present to support the President.

BUSINESS MEETING.

During the subsequent business proceedings, the Mayor (Councillor T. Hartley) was asked to present to the Past-President, Mr. J. T. Haynes, a framed photograph of the members of the Council during Mr. Haynes's year of office. This he did, complimenting the recipient upon the manner in which he had conducted the business of the Association.

The Treasurer submitted the balance-sheet, which was approved, subject to audit.

Mr. Robinson (Altrincham) made an offer of a prize for the best paper to be given during the session.

The Hon. Secretary (Mr. J. Alsop, Bolton) read the annual report, which showed that there were 229 members and two honorary members, as compared with 215 reported in April, 1925—being an increase of 14.

Election of Officers.

The following officers were elected for the session:

President.—Mr. W. H. Battersby.
Senior Vice-President.—Mr. J. T. Haynes.
Junior Vice-President.—Mr. F. B. Small.
Hon. Secretary.—Mr. J. Alsop.
Hon. Treasurer.—Mr. I. H. Massey.
Auditors.—Messrs. F. A. Collier and H. Dean.
New Members of Council.—Messrs. T. R. Cook, Southport; H. P. Lupton, Liverpool; C. H. Bamber, Bolton; and H. C. Applebee, Manchester.

PRESIDENTIAL ADDRESS

OF

Mr. W. H. Battersby, of Bury.

Allow me, in the first place, to thank you for the honour you have conferred upon me by electing me your President. I fully realize the responsibilities of the position, inasmuch as it is one conferred solely with the goodwill of the members. I highly appreciate and warmly reciprocate the friendly feelings which that implies; and you may rest assured that nothing within my power shall be left undone to further the best interests of the Association.

Junior Associations.

It will not be out of place if I first briefly refer to the formation, history, and record of the Association. Founded in the year 1898 by a number of enthusiastic young men, it was the first of the Junior Associations—a fact of which we may be justly proud. Similar societies have sprung up in all parts of the country; and there is no doubt that they have met a very real demand. They have provided additional avenues for the interchange of knowledge, by the reading and discussion of papers and by the arrangement of visits to gas-works and other engineering establishments. They have been a means of contact between the staffs of gas undertakings situated, in many cases, widely apart, and have supplied facilities for mutual self-education where none previously existed. There are to-day no fewer than seven Junior Associations, with a total membership of over 1500. The "Joint Transactions" are now published annually, and form a valuable compendium, particularly of the more detailed information which is proper to junior members of the gas profession. The formation of classes in gas engineering at the Manchester College of Technology was, no doubt, attributable to the early activities of our own Association, and there is no reason to doubt that all the Junior Associations have exerted, and will be able to exert, sufficient influence to secure those educational facilities and that recognition of our technical training which are our due.

Since its inception, the work of the Association has continued without a break, and testimony to its value and high standard has been rendered on many occasions by eminent gas engineers. We have a splendid record, and it is for the juniors of to-day to see that it is at least maintained on the high level of the past.

The Juniors' Task.

The work of assistants in the many branches of gas manufacture and distribution is of greater importance to-day than ever. Materials and labour are more costly than in the early days of the industry. Electrical competition grows in keenness, assisted by the erroneous belief that this form of energy is more efficient than gas, whether scientifically or from the point of view of national well-being and economy. These criticisms, of course, can be met and neutralized. We are producers not only of gaseous and solid fuels, but also of bye-products which are of great national importance, necessary in peace and indispensable in war. The cry for industrial efficiency is heard on every hand; and to realize this in our own industry means assiduous and efficient technical control. The chief executive officer of a gas undertaking must, therefore, make more and more demands upon his juniors, leaving many of the duties associated with the details of manufacture and distribution to them. We, on our part, must bring to these duties thoroughness and thoughtfulness in order that the highest scientific efficiency compatible with financial economy may be secured.

In plant and apparatus working under constant load for long periods, faults or breakdowns occur at awkward and unexpected times, and I know of no better way of meeting these difficulties than a careful anticipatory study of possible emer-

gencies and methods of dealing with them. Our slogan must be "Be Prepared."

Know Your Plant.

In the first place, the junior must know his plant. It is important for him to know the limiting capacities of every item of the apparatus, and to gain as accurate an idea as possible of the margin between these and the loads actually carried. He should keep a record in his notebook of the horse-power of all the steam engines, dynamos, and motors on the works; the speed and capacities of conveyors and elevators; and the capacities of all pumps and tanks. The estimation of the cubical content and tonnage of irregular heaps of coal and coke is something of an art; and no opportunity should be neglected by juniors of gaining experience in this important part of stocktaking. Daily observations should be made of all portions of the plant which may come within our notice; and the habit should be formed of asking ourselves what the apparatus is doing, and what more it could do if called upon; how much coal we have in stock, and how long it would last in an emergency; how much coke we have for sale, and how much we are producing per day. The pupil, at the outset of his career, should realize that sound practical knowledge and experience are only to be acquired by slow and natural growth, and are often possessed by men who have more ordinary common sense than scientific or technical training. To the pupil of a modest and cheerful demeanour in his dealings with foremen and plant operators, much useful practical knowledge will be imparted which is not to be found in text books.

Looking through the Transactions of our Association, I find that we have had presented to us little information relating to the actual operation, and particularly the maintenance, of vertical retort installations; and in the attempt to make good this omission, and with the hope that it will be of interest and value to the members, I intend to give you an account of the installation of vertical retorts which we have had in operation at Bury for over four years dating from July 22, 1922.

Verticals at Bury.

Our installation consists of 40 retorts on the Glover-West system of the 33-in. elliptical model, 21 ft. long. The retorts are arranged in five settings, each containing two units of four retorts, with a producer and chimney to each setting. One setting is fitted with a West-Galloway natural-draught water-tube waste-heat boiler.

Each unit of four retorts is surrounded by a series of combustion chambers, the sectional plan of which is shown in fig. 1. It will be seen that the producer gas rises in a vertical

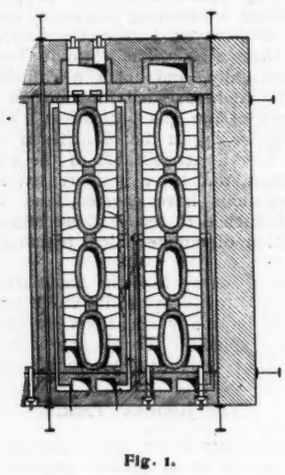


Fig. 1.

flue in one side of the setting. Secondary air rises in uptakes on the other side of the setting, and is admitted to each combustion chamber at two points. The products of combustion rise vertically within the setting in contact with the back row of retorts and adjacent to the secondary-air uptake. There are five horizontal combustion chambers, one above the other; and above these are three circulating chambers in series. The working temperature of the combustion chambers is from 1260° to 1300° C., and that of the top circulating chamber up to 900° C. The temperatures are conveniently and readily manipulated; and we work at Bury with all retorts at the same speed of coke extraction. Coal is delivered to the bunkers above the settings by bucket elevators, and band and pushplate conveyors. Coke from the retorts is discharged into a De Brouwer hot-coke conveyor adapted from the horizontal retort bench which used to occupy the site, and is elevated and deposited in hoppers supplying railway trucks and other vehicles.

Throughput the Main Consideration.

We have carbonized all classes of Lancashire and Yorkshire coals in the shape of nuts, peas, beans, and slacks, and we have averaged seventeen different classes of coal passing through the retorts at any one time. Our average daily throughput is 2·88 tons, against the nominal 2·75 for this type of retort. From the commencement of working the plant, our policy has been maximum output of gas per retort, to secure the greatest possible gas production from the installation. We readily obtain 50,000 c.ft. of 475 B.Th.U. gas per retort, giving a winter production, when all the retorts are in operation, of 2 million c.ft. per diem, against a nominal capacity of 1½ millions. This policy has been amply justified not only by low labour cost and fuel consumption, but by long life of retorts and low maintenance charges. In a four days' test, the following results were obtained:

Retorts in operation	24
Coal carbonized per retort per day	3·16 tons
Gas made per retort per day, corrected	55,343 c.ft.
Make per ton, corrected	17,510 c.ft.
Calorific value	456 B.Th.U.
Therms per ton	79·85
Make per setting per diem	442,744 c.ft.

Life of Retorts.

The settings are marked A, B, C, D, and E. The four settings B to E commenced gas-making in July, 1922, and setting A in October, 1922, for the winter load.

Only three settings are necessary for the summer load, and in the spring of 1923 we let-down settings D and E. The side linings of the producers were repaired, requiring about 100 bricks for each producer, and the retorts were washed down. Setting E was restarted on Aug. 6, and D on October 18 of that year.

In 1924 setting C was let-down, similar repairs were carried out, and it was restarted on Oct. 20 of the same year.

Settings A and B were let-down during 1925; A was let-down on April 7, and B on July 2. The producers of these settings had been in continuous operation for three years, and only the sides needed repair; the curtain arch being in perfectly good condition. The retorts required a certain amount of pointing-up, but the two settings were again put into operation without any difficulty—B on Aug. 22, and A on Oct. 1.

This year settings D and E have been let-down. Setting D was let-down on May 20, and setting E on Feb. 25. The producer linings have been again repaired at the sides, and the retorts pointed and washed down. Both settings will be restarted in the autumn, as required by the winter load.

Next year settings B and C will be let-down, and it is possible that a considerable amount of resetting will be required. There will not be much difference in the life of the retorts in these two settings.

Taking those in setting B, we find that they have done 1474 working days to Oct. 1 this year. To this will be added 200 days until the spring of next year, making a total of 1674 working days. The quantity of coal carbonized is calculated at 2·85 tons per retort per diem, *less* 3½ p.ct. for scurfing, giving 4605 tons of coal carbonized.

Maintenance.

We calculate that the whole cost of maintenance, together with the cost of a complete resetting next year, will not be more than £1100 for the eight retorts in B setting, so that the total cost of maintenance of these retorts will be 5·72d. per ton of coal carbonized. The maintenance costs of the whole plant include repairs to producer linings, as already described, one new extractor worm shaft—which broke owing to the use of a faulty safety bolt—three new plugs, one new supporting bar for the gas valves, four new pawls for the extractor driving gear, twenty studs for the mouthpiece covers, replacing the cast-iron drip plates originally supplied for the producer step grates by steel plates, and fifty cast-iron slides for the ascension pipes.

Repairs to the coal-handling plant and coke extractor gear have been negligible. The gas engines driving the coke extractors consume 20 c.ft. of gas per ton of coal carbonized, while seven tons of coal are carbonized for each unit of electricity consumed by the motor driving the elevator and conveyor over the vertical retort plant. This motor works in a very bad atmosphere, but is of the "Lo-Thermo" type with air circulation, made by Messrs. Electromotors, Ltd., and has given no trouble whatever.

Throughput of Coal.

I have no doubt that vertical retorts will give average results without any more particular attention than used to be given to carbonizing plant in the old days. But it is one of the striking characteristics of the continuous vertical retort that it gives a rich reward for careful handling. An energetic junior in charge of this type of plant has plenty of scope for the application of brains to his work. For instance, there are several details of practical working which, with systematic attention on the part of the stokers and shift foremen will result in a good and continuous travel of the charge through the retort, even when carbonizing a mixture of many different kinds of coal in varying proportions. This means that the plant will be giving a much better return than if these measures are omitted. In our own case each retort will give easily and with-

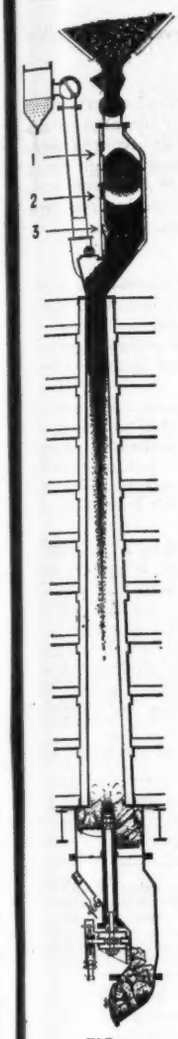


FIG. 2.

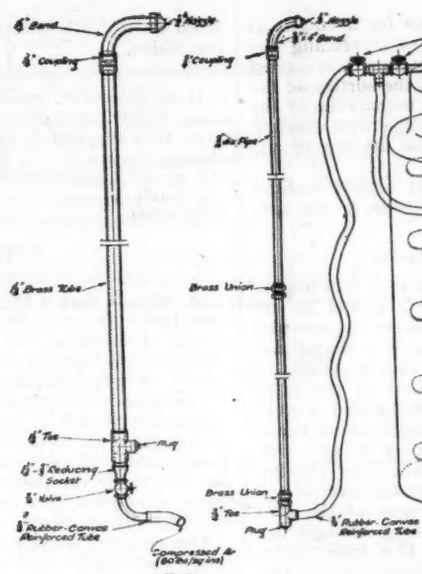


FIG. 3.

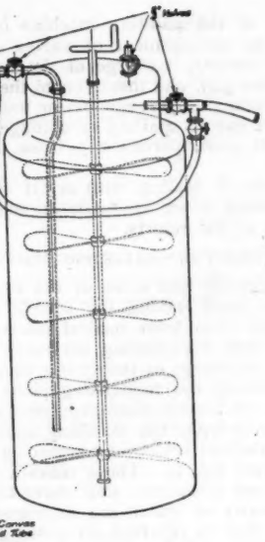


FIG. 3a.

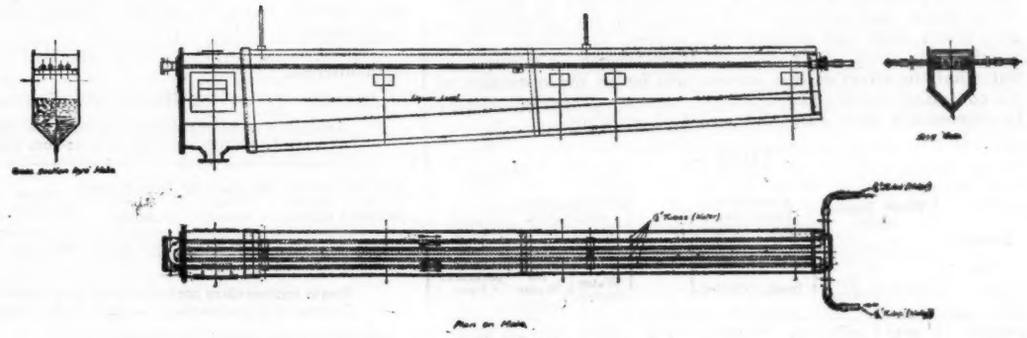


FIG. 4.

out any special attention the 40,000 c.ft. or so per day for which they were designed. By systematic treatment, we have been able to increase this to 50,000 c.ft., and on occasions to 55,000 c.ft., per retort per day.

Some examples of our methods may be given. For instance, we prick-down hourly, fill the coal-feeding hoppers every two hours, and pass the auger through the ascension pipes at the commencement of each shift. A golden rule in the operation of continuous vertical retorts is to keep the gas ways clean and open.

Another point which we watch very carefully is the maintenance of a continuous movement of the coal from the hopper to the retort. We have ourselves made an addition to the means originally provided for observing this movement, which we think has been justified by the results. We have added to the coal-feed hopper an inspection point midway between the original top and bottom trial holes (fig. 2). We are thus able to use a test wire of definite length, which can be inserted first in the top hole, and then, as the coal descends in the hopper, in the new middle hole. Immediately before the schedule time for pricking-down, the foreman goes round the plant and measures with the test wire the distance the level of the coal has sunk in the hoppers since the last inspection. This measurement at once indicates when the descent of the charge in the retort is being retarded for any reason; and a chalk mark is made on the hopper to indicate to the stoker that a little extra attention or observation is necessary in the case of that particular retort. Troubles are thus detected and dealt with at an early stage, before they have had time to grow and accumulate into real difficulties. We have also improved the method of covering this inspection hole by the arrangement of a flap secured against the hopper plate by a small spiral spring; the hole itself being covered over by a large rivet head secured to the back of a spring plate.

Repairs to Retorts.

The principle of tackling the little troubles before they grow into big ones is usefully applied in the treatment of the retorts themselves. We have a practice of inspecting every retort when it is emptied for scurfing, and we spray any rough places by a piece of apparatus which was really developed for the more serious operation of patching the retorts.

The usual method of patching retorts under fire from the inside with "podge" at the end of a long paddle, as used for horizontal retorts, is more or less impracticable for verticals. Juggling with a piece of "podge" at the end of a long paddle is a tricky job, trying to patience and temper. Usually the "podge" falls off the paddle before it is anywhere near the hole in the retort. We discussed and tried various methods of getting the "podge" into the hole; and the apparatus about to be described was the outcome.

"Podge" Blowing.

Our method is to blow the "podge" into the hole by compressed air. We were fortunate in having on the works a Westinghouse compressor which had been used for supplying air to atomizers, pneumatic hammers, and similar appliances. The construction of the apparatus is simple and substantial. A 12-ft. length of light-gauge brass tube 1¼-in. bore is fitted with a ¾-in. valve at one end, and a bend and a ¾-in. reducing piece are screwed to the other. This was christened the "patching gun" by the men. A length of flexible hose connects the air supply to the valve inlet. The "gun" is charged by removing the reducing piece, running-in a supply of fairly thick "Korktite" paste, and replacing the reducing piece. The coke extractor of the retort under treatment is masked-off and opened. The "gun" is passed up through the extractor, and the nozzle is directed towards the hole in the retort. The air valve is opened, and the patching material is shot with sufficient force into the hole. One or two repetitions may be necessary to fill the hole completely. Repairs carried out in this simple manner have been very satisfactory. The filling stands up to the temperature, and remains undisturbed by the travel of the charge. The apparatus is shown in the accompanying fig. 3.

The retort spray was a development of the "patching gun." We use a compressed-air painting machine as shown in fig. 3a, which is filled with a very thin, almost liquid, paste of "Korktite" or other retort cement. The "gun" is essentially similar to that previously described, and is directly con-

nected to the tank of the painting machine by a length of flexible hose. By an arrangement of valves controlling the compressed-air and cement, a charge of the liquid is ejected from the tank into the gun, and thence on to the surface of the retort. By this apparatus any roughness or indentation of the interior of the retort due to spalling or damage with scurfing tools is readily dealt with, particularly from the top of the retort.

These two methods of dealing with retort defects without the necessity of cooling down are material aids in the prolongation of the life of the retorts.

Gas Cooling in Collecting Mains.

No doubt the suggestion that some of the heat which goes to waste in the gas itself leaving the retorts should be recovered, is not novel. Gas from vertical retorts is generally considerably hotter than that leaving horizontal settings, and there should be an advantage in recovering this heat and, at the same time, relieving the condensing plant of the extra work. We made an interesting attempt to deal with the problem. We inserted in the top of the collecting main of one bench of the Glover-West vertical retorts a number of water tubes, 1½ in. in diameter (see fig. 4). These tubes extend the full length of the main, and are placed well above the level of the liquor. Inlet and outlet of water are arranged at the producer end, and the flow is reversed on passing through the tube box at the opposite end of the setting. The water, when heated, passes to the feed tank of the waste-heat boiler. The water is taken from an overhead tank, and the volume measured by a standard water meter. Thermometers are arranged to show the temperatures at inlet and outlet, and also of the gas leaving the collecting main. I have shown in Table I. to what extent this heat recovery can be carried with the corresponding reduction of gas temperature at the outlet of the main, and in Table II. I have given the analysis of the tars taken with and without this method of cooling. These are data the study of which may reveal something interesting; but what the effect of this process will be on the operation of the collecting mains and the works' economy generally can only be determined after a lengthy period of working.

Table I.

Duration of Test.	Water Passed, Galls.		Circulating Water, Aver. Temp., ° Fahr.		Rise, ° Fahr.	Average Temp. of Gas from Main, ° Fahr.		Reduction in Gas Temperature. ° Fahr.
	Total.	Per Hour.	Inlet.	Outlet.		Water Cooled.	No Water Cooling.	
2 hours .	203	101·5	54	108·4	54·4	232·0	281·2	49·2
2 hours .	184	92	49·24	120·36	71·12	231·0	278·4	47·4

Results from one bed of eight retorts producing 400,000 c.ft. per diem.

Table II.—*Calculated per Ton of Tar on Basis of 5 Gallons Liquor per Ton.*

Method of Working.	Sp. Gr. 60° Fahr.	Water.	Naphtha.	Light Oils.	Creosote Oil.	Pitch.
		Galls.	Galls.	Galls.	Galls.	Cwt. Q. Lbs.
Cooler shut off. .	1105	5·0	1·70	6·44	88·35	9 3 17
Water cooled main	1134	5·0	1·22	7·01	77·10	10 3 21
Difference obtained by cooling main. . .	+0·0029	..	−0·48	+0·57	−11·25	+1 0 4

While on the subject of collecting mains, it is well to deal with the question of the deposits of carbon and pitch which have been found to take place in this portion of the plant under certain conditions. It is indisputable that the practice of working the retorts under vacuum is responsible for most of the troubles which have been experienced; but we find that often after careful regulation of the pressure in the mains and in the retorts, with some classes of coal, deposits will occur which must be dealt with. It was noted that all these deposits originated from the gas valve forming the connection between the ascension pipe and the main. The deposits in the gas valve are easily cleared away by rodding into the main; but unless due precaution is taken, these deposits, falling into the main, give rise to accumulations of pitchy matter within the main itself. We found, after several attempts, that the best way of preventing these accumulations was an arrangement of liquor sprays fixed in the mains at points where the deposits occur—that is, near the gas inlets from the valves. Fig. 5 shows the arrangement of the sprays in the collecting mains, and the method of fixing to obtain quick and easy removal for inspection at frequent intervals, as the nozzles have a tendency to make-up and become useless. The condensates which accumulate in the mains are run off every morning, and the mains are refilled with liquor. During the present unhappy dispute in the mining industry, when large quantities of very dry and dusty slacks have been carbonized, this method of operation has enabled us to work without any trouble whatever in the collecting mains.

Naphthalene.

It is, of course, generally known that vertical retorts result in an entire absence of naphthalene trouble in the area of supply. Gas supplied to the district has given an average naphthalene content of 2·75 grains per 100 c.ft.; and though during the winter months two beds of horizontals have also been working intermittently, our district has been entirely free from naphthalene deposits in the mains and services.

Waste-Heat Recovery.

Some references having been made to the waste-heat boiler, it is thought that a few details of the West-Galloway water-tube boiler and superheater installed on E bed will be of interest. This boiler has given excellent and reliable service. The nominal capacity of 250 lbs. of steam per hour has been greatly exceeded in practice.

The general arrangement of chimney, by-pass, and control dampers is shown in fig. 6. Steam is generated in the boiler at a pressure of 80 to 100 lbs. per sq. in., superheated to 600° Fahr., and reduced to 10 or 20 lbs. pressure before entering the retorts for the purpose of steaming the charge. The feed water is supplied by a small pump driven by belt from the coke extractor driving shaft.

The supply of water to the boiler is controlled by a "Thermo-feed" automatic feed-water regulator. The boiler is also equipped with a high and a low water alarm operating a steam whistle; and as an additional precaution in case the whistle should be choked, we have arranged an electrical contact on the operating lever to bring into action an electric bell working on the 220-volt lighting circuit. One of the obvious advantages of the electric alarm is that it may be placed a considerable distance from the boiler without affecting its efficiency in any way.

The following details of the 12 hours' test on the boiler will be of interest.

Duration of Test—12 Hours. Readings taken every hour.

Amount of water evaporated per hour (average) = 523 lbs.
Corrected readings (average) over 12-hour period.

Draught Under Boiler.	Draught Above Boiler.	Temperature Under Boiler.	Temperature Above Boiler.	Steam Pressure.	Superheat Temperature.	Feed-Water Temperature.
0·445 in.	0·313 in.	1573° Fahr.	876° Fahr.	89·4 lbs.	648° Fahr.	53° Fahr.

Steam temperature corresponding to pressure = 313° Fahr.
Amount of superheat 648° − 331° = 317° Fahr.

Analysis of waste gases: By volume—

CO_2.	O_2.	CO.	N_2.	Under boiler.
16·4 ..	2·75 ..	*Nil* ..	80·85	

Coal carbonized in setting . . = 23·039 tons per 24 hours.
,, ,, per retort . . = 2·88 ,, ,, ,,
Coke to producers . . . . . = 7980 lbs. ,, ,,
Less moisture, pan ash, clinker, and small unconsumed coke taken from ash pan . . . . = 1626 lbs. ,, ,,
Net carbon consumed . 6354 lbs. ,, ,,

Net amount of fuel consumed per ton of coal carbonized

$$= \frac{6354}{23{\cdot}039 \times 2240} \times \frac{100}{1} = 12{\cdot}30 \text{ p.ct. (dry, ash-free coke).}$$

Net carbon consumed per hour = 264 lbs.
Water evaporated = 1·98 lbs. per 1 lb. of carbon consumed in producer.

Plant Control.

The Glover-West verticals are designed to give the highest possible number of gaseous therms from the coal carbonized; and this can be achieved under efficient control and supervision, and where systematic attention is given to physical, chemical, and mechanical operations involved. The extent to which control is exercised will, no doubt, be governed by local conditions. There are, however, certain details of working to which we at Bury have always given very careful thought and attention in order to obtain good practical efficiency. It is of first importance to secure daily average samples of the coal for carbonization in the settings; and the most convenient place for collection is the conveyor discharging into the retort house coal bunkers. Samples taken at this point and tested for moisture, volatiles, and ash, together with notes as to size and appearance of the coal, will be sure to indicate in the aggregate some idea of the daily value of the fuel delivered to the settings. Ample warning will also be given of any drastic changes in the composition of the coal. The foregoing data carefully collected from representative samples will counteract, and possibly explode on many occasions, the idea or excuse that all retort house troubles are due to bad coal.

On the arrival of trucks of coal for testing, notes and analyses should be made from carefully chosen samples; and it is worthy of note that a power-driven grinder enables good big samples to be dealt with. Should the laboratory tests show the coal to be worthy of fuller investigation, a practical test can be carried out in one or two retorts, in order to ascer-

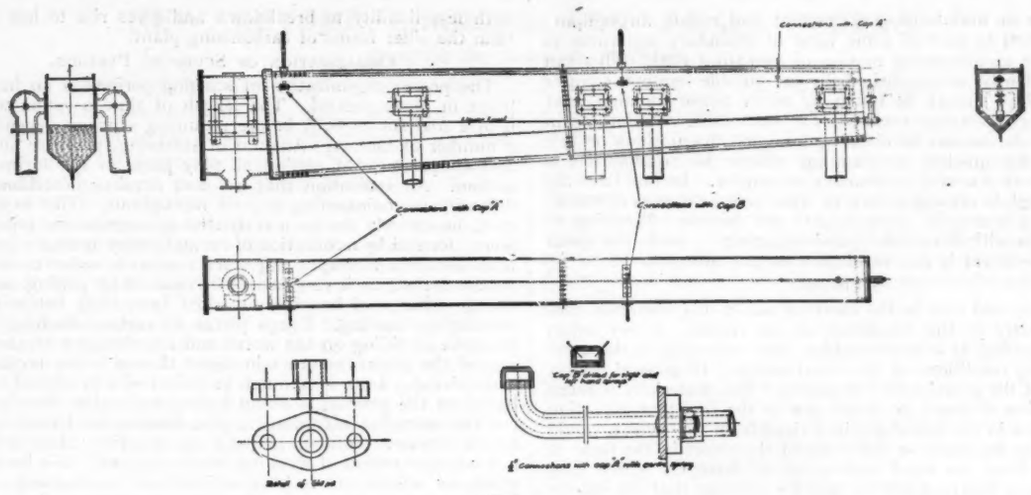


FIG. 5.

tain the rate of carbonization, size, and density of coke produced, and amount of breeze made. This information, carefully collected and tabulated, is extremely valuable in the selection and purchase of coals for carbonization.

In addition to spot testing of the make, analyses and calorific tests taken on gas samples collected over a definite period are of particular importance. The apparatus employed for this purpose may be either a small gasholder or a special form of automatic sampler depending upon the displacement of gas by water. Whichever type is adopted, the volume collected should be sufficiently large to allow of several estimations of calorific value and complete analysis. It is an excellent plan to collect regularly samples of the night production, as these greatly assist in valuing the make which has been produced during the time when supervision is, naturally, to some extent relaxed, and the shift foremen may be tempted to secure maximum makes of low quality. A recording calorimeter frequently tested against a standard instrument is very useful; but, for the guidance of workmen, the jet photometer set to give a standard length of flame is a simple and reliable apparatus for indicating fluctuations in the quality on the inlet to the gasholder.

Combustion Chamber Temperatures.

For the control of combustion chamber temperatures, there are several types of reliable pyrometers on the market. In selecting an instrument, the points to be looked for are portability, sufficient accuracy, and the minimum of eyestrain. As the readings taken usually indicate maximum temperatures in the flues, it is essential that reliable notes be made of the distribution of the heating throughout the combustion chamber, otherwise the records may be misleading. A good idea of the comparative temperatures of the retorts may be quickly acquired by a close inspection of the quality of the coke during discharging operations. With efficient heating, the retorts in a setting should give nicely carbonized charges with all extractor worms operating at the same rate of extraction. This ideal of uniform working of the retorts can easily be accomplished by care and attention to the system of heat distribution. Strict attention should be given to details associated with the working of producers. Good producer practice is the first principle on which successful working of the settings depends. Regular charging at fixed intervals, and a record of the amount consumed by each producer are of great importance. Special attention must also be given to careful luting of the lids with sand, and cleaning of flues according to time-table. The top plates of the grate should not be banked-up with ashes taken indiscriminately from the pit of the producer, as these may consist of material easily washed or burnt away. The best medium to employ for this purpose is obtained by using only ash that has passed through a ½-in. screen, of which a supply should always be available. It can be conveniently stored in small wooden boxes (2 ft. 6 in. by 2 ft. 6 in. by 9 in.) arranged at suitable points on the retort house floor.

Coke Extractors.

The gearing and movements connected with coke extraction are designed for continuous working under the trying conditions of the retort house. Little time will be lost through breakdowns, provided the necessary attention is paid to lubrication, and the moving parts are maintained as free as possible from accumulations of dust and dirt. Stauffers on bearings and ratchets should be periodically charged with good high-temperature grease, and screwed-down occasionally. A special form of heat-resisting lubricant has been found to give the best results for the lubrication of the worm drive of the extractor shafts. The proper functioning of the extractors is of great

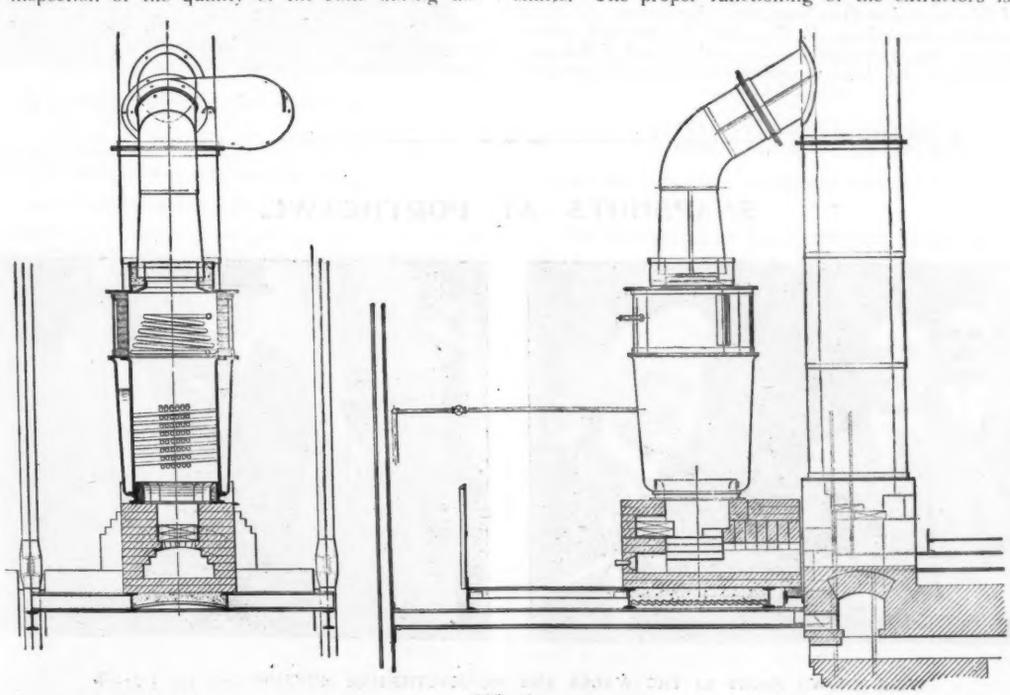


FIG. 6.

importance in maintaining a constant and steady throughput; and it is well to provide some form of secondary apparatus to register the reciprocating motion of operating rods. This can be conveniently accomplished by a suitable engine counter whose indices should be taken by retort house foremen, and the number of strokes recorded for each shift. Variations in speed may be caused by either gas engine fluctuations or belt slip, and for quickly ascertaining where the trouble lies a tachometer is a useful instrument to employ. In our case the engine speed is arranged to give 4500 complete movements of rods per 24 hours, or 3·125 strokes per minute. Working at these speeds with the ratchet pawl engaging 13 teeth, the speed of the coke worm is one revolution in 32·5 minutes.

Scurfing.

Regularity and care in the carrying out of this operation contribute greatly to the durability of the retorts. Every retort requires scurfing at intervals which vary according to the average working conditions of the retort bench. In general it may be said that the practice of "steaming" has materially reduced the formation of scurf, no doubt due to the fact that a portion of the carbon in the added gas is derived from that which would otherwise be deposited on the walls of the retort in the form of scurf. At Bury we scurf each retort at intervals which vary from seven to fourteen weeks, and we arrange that the retorts shall be stood-off for this operation at the week-end, when the demand for gas is at the minimum. But the operation itself calls for some care. The scurf is removed mainly by combustion in a stream of air admitted at the base of the retort; and if this combustion is too rapid, considerable damage may be done to the internal surface of the retort. In the preparation of the retort for scurfing, some precautions must be observed. It is not necessary to reduce the heat in the setting, nor need any difference be made in the working of the other retorts in the same unit of the setting. The retort is allowed to empty itself by the ordinary action of the coke extractors, which may be speeded-up after (say) one half of the contents of the retort have been withdrawn. The slide is placed in the bottom of the coal bunker, and the coal feed hopper is allowed to run completely empty. All coal must be cleared out of the hopper, and also from the top of the coal valve—the latter by the simple expedient of turning the plug to the open position and back. In both these situations any small residues of coal would take fire (if left), and give rise to some inconvenience. When the retort is empty, the opportunity should be taken to clean the top mouthpiece, where deposits of pitch may take place. The inspection door in the coke chamber is opened, and the degree of opening is the point to watch, to avoid excessive heat in the retort, due to the combustion of the scurf. We usually open the door about 2 in. at the bottom of the oval, and keep it in that position with a wrought-iron hook. The coke discharging door is, of course, closed. The air is allowed to pass up the retort for about twelve hours, after which the inspection door is closed, and the remainder of the scurf is dislodged by bars from the top, care being taken to do no damage to the retort. It is important to clean the scurf out of the coke chamber.

The great point to observe during scurfing is that the retort must not become any hotter or colder than during working. It is possible that more damage is done to retorts from the careless handling of this operation than from any other cause.

Under working conditions, if the plant is operated under pressure both in the retort and in the setting, and if the gas ways are kept clean and clear, a vertical retort plant is operated with less liability to breakdown and gives rise to less anxiety than the older forms of carbonizing plant.

Organization of Scurfing Periods.

The proper organization of scurfing periods is an important point in plant control. The length of time a retort will carbonize coal successfully before requiring scurfing depends upon a number of factors. Amount of steaming, pressure on retort, and temperature of setting all play parts in the formation of carbon. An indication that a retort requires decarbonizing is difficulty in maintaining a good throughput. This may, however, be entirely due to a restricted passage in the top mouthpiece, formed by a collection of tar and pitchy matter; and there is no occasion to empty and scurf a retort in order to clear this accumulation, as it can easily be removed by poking on to the charge after coal has been worked to a little below the top mouthpiece casting. Large pieces of carbon discharged with the coke or riding on the worm and interfering with the working of the retort are certain signs that a retort requires decarbonizing. I am very much in favour of a system of scurfing based on the general working behaviour, rather than carrying out the operation according to plan from a fixed time-table, as by the former method, built-up on practical observations, a much longer period of working can be secured. We have many examples where retorts have satisfactorily carbonized coal for from twelve to fourteen weeks without scurfing. It is a good plan to leave the practical details connected with this work to one man; for if the right man is chosen and carefully trained, the work is considerably accelerated, and the risk of damage to retorts and coal boxes by over-heating is reduced to a minimum.

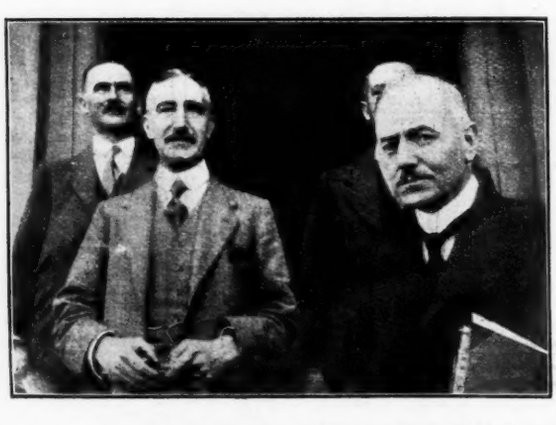
It is customary in some gas-works to find the records of scurfing entered up in a special book or time-table; but, in addition, I would recommend the practice of an entry in the daily carbonizing book on a small block plan similar to the following. Here the foreman places a cross in the corresponding square during the time a retort is off scurfing, giving a convenient record which is always available to those responsible for the working of the plant.

SCURFING.

7	8	7	8	7	8	7	8	7	8
5	6	5	6	5	6	5	6	5	6
3	4	3	4	3	4	3	4	3	4
1	2	1	2	1	2	1	2	1	2
A		B		C		D		E	

Mr. Hailstone (Rochdale) moved, and Mr. Byrom (Stalybridge) seconded, a vote of thanks to the President for his Address; and this brought the meeting to a close.

SNAPSHOTS AT PORTHCAWL.



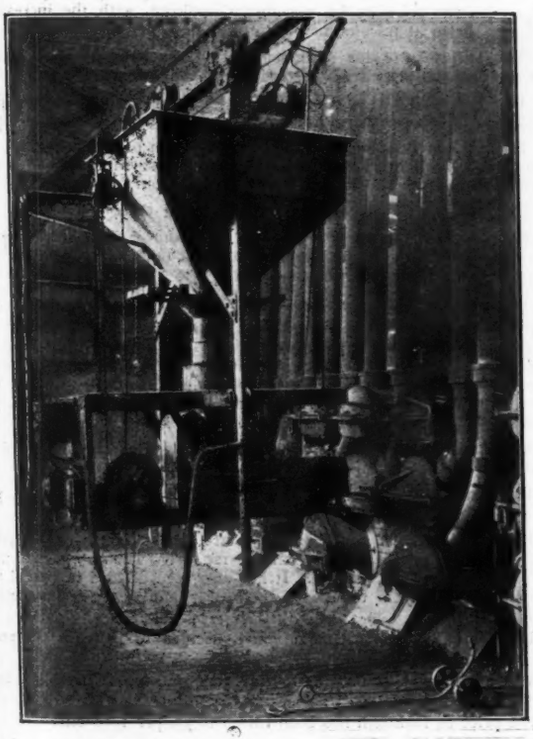
WELL-KNOWN FACES AT THE WALES AND MONMOUTHSHIRE MEETING [see pp. 107-10].

NEW RETORT CHARGER FOR SMALL WORKS.

Modified De Brouwer Machine.

Large gas undertakings are not solely responsible for the moulding of public opinion about gas. There are many more small concerns than large ones; and the influence of these small works is in the aggregate very great. It is true that the larger undertakings have in many cases greater scope for the adoption of efficient methods; but the enterprise of manufacturers of gas plant is gradually placing at the disposal of managers of small works apparatus specially suitable for their needs, low in cost but possessing the refinements and advantages of the plant supplied to those undertakings whose operations are extensive. How many gas undertakings, we wonder, have had to remain satisfied with hand stoking for the simple reason that cheap and efficient chargers were not available? However, these conditions no longer obtain. Chargers designed for the smallest of works are now on the market.

Recently we had the opportunity of inspecting the new De Brouwer charger manufactured by Messrs. W. J. Jenkins & Co., Ltd., of Retford. The machine is installed at the works of the Hoddesdon Gas Company; and Mr. S. Smithard, the Manager and Secretary, expressed his complete satisfaction with its working. As the outcome of its installation, he said, not only



De Brouwer Charger for Small Gas-Works.

are carbonizing results better, and the costs of labour lower, but the conditions of labour have been greatly improved.

IMPROVED WORKING AND CONDITIONS.

The Hoddesdon Gas Company send out 50 million c.ft. of gas per annum. Stop-ended horizontals are the carbonizing unit. There are two beds of 8's and two beds of 6's, and the retorts are 22 in. by 16 in., 10 ft. long. Prior to the installation of the De Brouwer charger, which was put in a year ago, three 8-hour charges constituted the method of working, and the time taken for charging each retort was 3½ minutes—and it was really hard labour. Now the retorts are charged four times in 24 hours—*i.e.*, four 6-hour charges—and the time taken to charge each retort is only 20 seconds. And, as Mr. Smithard said, the charge is more effective, because it is evenly laid throughout the length of the retort. He attributes to the charger an increased make of over 1000 c.ft. of 480 B.Th.U. gas per ton of coal carbonized; and its installation has enabled the Company to save the labour cost of one man per 24 hours, which is a considerable gain. We were informed that the charging plant will easily pay for itself in two years' working from the time it is installed. There is, of course, another advantage besides increased make per ton, and that is greater make per mouthpiece. In other words, the capacity of a hand-stoked setting can be increased considerably by adopting the stoking machine—a point of first-rate importance in these days of rapid development. Having set out a few of the advantages of the new De Brouwer charger, we will consider its construction.

THE NEW MACHINE.

The plant at Hoddesdon comprises a small bucket elevator operated by a 4-H.P. electric motor, which raises the coal to a 10-ton overhead hopper feeding the 1-ton hopper on the charger itself. The latter is really a small edition of the large De Brouwer charger, the working features of which are well known to readers of the "JOURNAL." The small edition is suspended from girders traversing the retort house, and is moved laterally and vertically by hand. A 4-H.P. electric motor drives the endless rubber belt which shoots the coal into the

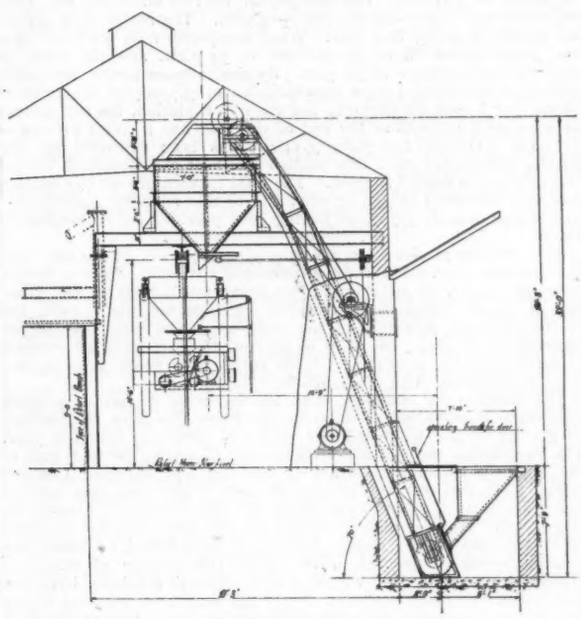


Diagram showing the Lay-out of the Plant.

retort, and current is taken for this motor from a wall plug in the retort house. From this short description, it will be gathered that the whole plant is extremely simple and eminently suitable for small works. Any ordinary stoker can operate it. At Hoddesdon, for example, the stokers worked the machine at once, and without the slightest difficulty. It will be understood, too, that the coal is not handled by manual labour. It is simply dumped into the elevator pit. The plant does the rest of the work. The appearance of the machine can be seen from one of the accompanying illustrations. We were most favourably impressed with the plant. The whole mechanism is absolutely simple; and this makes the machine particularly suitable for small works. It will not be long, we think, before the many advantages of the new charger are more fully realized.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Development and Reconstruction of the Portslade (Brighton) Gas-Works.

SIR,—The excellent paper by Mr. Rutter will have given interest throughout the gas industry, but there is one point touched on, in the editorial, in the body of the paper, in the discussion, and in the drawings, which, unfortunately, was not completely elucidated. I refer to "what actual allowance for the expansion of silica did the author make in the *all-silica* settings?"

The President, in his remarks, said:

> "In his reply to the discussion, Mr. Rutter might also deal with the question of expansion. At first I thought it was an error to allow for expansion ⅜ (*sic*) in 1 ft.; and if he will enlarge on this point it might be an advantage."

Unfortunately, this point was not developed to a final definition; and as all the published drawings show the fireclay retort, would it be possible for the author to give a view (similar to section C-D in the paper) clearly indicating the means employed to take up the silica growth of the all-silica setting, and to say what allowance was made in the length of the silica retort? If so, and this illustration could be published in the "JOURNAL" while the paper is fresh in mind, it would, I am sure, complete an excellent practical paper, to general advantage.

AD REM.

Oct. 9, 1926.

MISCELLANEOUS NEWS.

CITY OF BRADFORD GAS DEPARTMENT.

Reporting to the Gas Committee on the working of the Department for the year ended March 31, Mr. Charles Wood, the Engineer and Manager, says that the financial statement prepared by the City Treasurer shows that the gross income for the year amounted to £506,969, and the expenditure to £429,273, leaving a gross profit of £77,696. Out of this the following charges had to be met: Interest on loans, &c., £45,309, contribution to sinking fund £15,524, and income-tax £9275, leaving a profit on the year's working of £7588.

In comparison with the figures for the preceding year, the gross income is reduced by £35,106, and the gross expenditure shows a reduction of £24,109. The charges for interest on loans, &c., sinking fund, and income-tax are less by £5612. The net profit is £7588, as against £12,973 last year. When compared with the year 1914, the gross income shows an increase of 54 p.ct., and the gross expenditure an increase of 58 p.ct. By the transfer of the net profit, and after providing for an appropriation of £7200 for the relief of rates, and £1605 for damages and costs *re* explosion, the net revenue appropriation account at the end of the year has a credit balance of £41,426. During the year, £14,493 has been expended on new mains, and £1848 on a new station meter at the Birkshall Works, and charged to capital account. The total expenditure on this account has been increased to £1,337,280; and of this amount, £569,651 remains outstanding, £767,629 having been provided for redemption of loans.

The amount received for gas was £341,240, or £2541 less than the previous year. The revenue per 1000 c.ft. sold shows a decline from 3s. 5·347d. to 3s. 4·853d.; this being attributable to the reduction of 3d. per 1000 c.ft. brought into operation on July 1, 1924, and to the extended operation of the scale of special rates for the industrial use of gas. The sales of gas for the year show an increase of 9,167,000 c.ft., or 0·46 p.ct.; the yearly total being 2,004,665,000 c.ft., as compared with 1,995,498,000 c.ft. in 1925.

The markets for residuals, with the exception of tar, were again most unsatisfactory; and the total receipts under this head are £98,054, or £32,532 (equal to 3·967d. per 1000 c.ft. sold) less than last year. The expenditure for coal has decreased by £31,126; the total cost of the quantity carbonized (including carriage and handling charges) being £166,781, or an average of 21s. 1·39d. per ton, against £197,907, or an average of 24s. 6·05d. per ton, last year. During the year, 15,871 yards of mains, varying in size from 3 to 12 in., have been laid, and further works have been necessitated by street improvement works executed in the city. The mileage of mains at March 31 was 508. The wages of all classes of employee have not been subject to much variation during the year, and the total wages bill of £179,118 compares with £166,719 in 1925. During the year pre-war street lighting has been maintained. The quantity of gas used, 250,471,000 c.ft., shows a decrease of 2½ millions on the previous year. The sales of appliances through the Darley Street showrooms have again been satisfactory; the figures relating to the larger appliances being higher than any previously recorded. The value of the showroom is reflected in the increased use of gas for heating cooking, and industrial purposes. Consumers are availing themselves more fully of the facilities provided for them to become acquainted with the appliances best adapted to their particular requirements, and to acquire the most economical methods of using them. The cost involved in the maintenance of the showrooms at their present standard is fully warranted by the returns and advantages derived from them.

Mr. Wood considers that the results obtained during the year are satisfactory, having regard to the trying times. The financial outlook for the present year is not hopeful, but there is reason to expect that peace will continue in the gas industry.

PURCHASE OF THE KENILWORTH GAS-WORKS.

Meeting of the Coventry City Council.

On Sept. 28, the Coventry City Council considered, among other things, a proposal that an agreement entered into with the Kenilworth Gas Company for the acquisition by the Corporation, at a price of £38,500, of the undertaking, powers, and obligations of the Company, be confirmed.

The Mayor (Alderman F. Snape), in moving the recommendation, thought that the purchase would be a very wise step not only for Coventry, but for Kenilworth. The gas area of the Kenilworth undertaking was about 29 sq. miles, covering not only the Urban District of Kenilworth, but the parishes of Berkswell and Balsall, both of which were valuable potential areas for supply. Perhaps even more important was the fact that the area included that part of the parish of Stoneleigh lying between Kenilworth and the recently acquired Stoneleigh estate of the Corporation. It would be realized that the purchase was part of a considered scheme for the development of the gas undertaking. He did not think anyone would regard the purchase price as unreasonable when he considered the Company's balance-sheet and assets. It was probable that the manufacture of gas at Kenilworth would not be continued indefinitely; and in all likelihood it would be found cheaper and better to supply the Kenilworth area from the Foleshill Works by the new high-pressure ring mains which were projected by the gas undertaking. When this was done, it should be possible for Coventry, without loss to itself, to supply gas in Kenilworth at a substantially lower price than at present charged by the Company. The proposals, of course, might need some modifications as the situation developed; and it was conceivable that if the Kenilworth Works could be sufficiently enlarged they might serve eventually as an auxiliary works for the supply of the southern part of the Corporation gas area.

The proposal was adopted.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Act.

SECTION I. ORDER.

Ossett Corporation.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 3½d. per therm, with an additional charge of 2d. per therm for prepayment meter supplies.

DECLARATION OF CALORIFIC POWER.

East Retford Corporation.—500 B.Th.U. (Jan. 1, 1927.)

INCREASES IN THE PRICE OF GAS.

Further Results of the Coal Stoppage.

The Abergavenny Gas Committee have decided to increase the price by 6d. per 1000. c.ft.

The Aldershot Gas, Water, and District Lighting Company have increased the price by ½d. per therm, making, with the increase of 1d. per therm at midsummer, a total of 1·8d. per therm.

The Directors of the Auchtermuchty Gas Company have decided to increase the price from 5s. 10d. to 7s. 6d. per 1000 c.ft.

The Bakewell Urban Council have decided to increase the price of gas to 1s. 2d. per therm for lighting, and 1s. per therm for heating.

The price at Ballymena has been raised from 6s. 8d. to 7s. 6d. per 1000 c.ft. for lighting, and from 6s. 3d. to 7s. 1d. for heating and power purposes. The increases are to date from Nov. 1.

Bideford gas has been increased by 1d. per therm.

The Bo'ness Gas Light Company, Ltd., have increased the price by 10d., making it 5s. 5d. per 1000 c.ft. for ordinary consumers, and 5s. 11d. for prepayment consumers.

The price at Bude has been advanced from 6s. 3d. to 6s. 8d. per 1000 c.ft.

The price in the Burgh of Paisley was under the consideration of the Gas Committee last week, when it was agreed to recommend the Town Council to increase it by 5d. per 1000 c.ft., or 1d. per therm. The new price will be 3s. 10d. per 1000 c.ft., or 9·2d. per therm.

An increase of 6d. per 1000 c.ft., as from July 1, is announced at Bury.

The Carlisle Gas Committee have increased the price by 6d. per 1000 c.ft.

The Carrickfergus Gas Company, Ltd., have increased the price by 1s. 8d. per 1000 c.ft., as from the 1st inst. The charge will now be 7s. 6d., instead of 5s. 10d. It has also been decided to curtail the consumers' supply to the hours between 7 and 9, 11 and 2, and 5 and 7.

The Coalville Urban Council have decided to increase the price by 5d. per 1000 c.ft.

At Cullompton, Devon, there has been an advance from 5s. 10d. to 7s. 1d. per 1000 c.ft.

The price at Dalkeith has been raised to 5s. per 1000 c.ft.

The Dundalk Gas Company have advanced the price from 5s. 7½d. to 6s. 3d. per 1000 c.ft.

The price at Dundee has been increased by 10d.—to 4s. per 1000 c.ft to ordinary consumers, and 4s. 3d. to prepayment rate users.

In Dungannon the increase is from 7s. 11d. to 8s. 2d. per 1000 c.ft.

The Falmouth Gas Company have increased the price by 2d. per therm.

The Filey Urban District Council have decided that the price of gas be increased from the next meter readings by 6d. per 1000 c.ft., with an equivalent increase to prepayment consumers.

The Kidderminster Gas Company have increased the price in the Kidderminster, Wolverley, Hoobrook, Cookley, and Cannsall districts by 1s. 2d. per 1000 c.ft.

An increase of 7d. per 1000 c.ft. is proposed at Newport, making the price 5s. per 1000 c.ft.

The Rhyl Urban Council have increased the price by 6d. per 1000 c.ft.

The price is to be increased at Shrewsbury, by 2d. per therm, from the Michaelmas meter readings.

The Stafford Town Council have decided to increase the price by 6d. per 1000 c.ft.

To the Stockton-on-Tees Corporation on Tuesday, Oct. 5, the Borough Accountant submitted a statement showing an estimated loss on the gas undertaking for the half-year of £6923. An estimate for the quarter ending Dec. 31 also contemplated a loss if foreign coal had to be purchased. In view of this, the Gas Committee recommended an advance by 5d. per 1000 c.ft., equal to 1d. per therm.

It was announced at a meeting of the Yeovil Town Council, on Monday, that the price would have to be increased by 1d. per therm.

The Welshpool Lighting and Power Company have increased the price, as from the next reading of the meters, by 10d. per 1000 c.ft.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The events of the past week have not improved trading prospects, and collieries and merchants are less inclined than ever to give quotations for after-strike periods. The threat to withdraw safety men has not caused any alarm among local collieries; the majority being quite capable of carrying on with their own officials and staffs. There are no signs of any breakaway on any considerable scale, and it is still assumed that Durham and Northumberland will be among the last to resume work.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

At one period last week the general importation of gas fuel appeared to be on the decrease, and gas concerns were caused some anxiety in respect of prompt supply. The situation, however, became easier, and it is anticipated that there will be no immediate difficulty, although some works, in view of the possible resumption of mining generally, have cut their stocks rather low. Prices have been inclined to stiffen again.

The general situation is easier, and coal is moving forward from the Midlands in good request.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

Competition for the inadequate output of pits at home continues to force prices higher. After allotments have been made towards domestic consumption and the various purposes to which priority is given, there is not very much left for industrial uses. The permit system, it is stated, is being strictly enforced in connection with all supplies other than those to which priority is accorded under the new Order. It is reported that manufacturing operations have been suspended in a number of cases rather than resort to imported coal. A large proportion of the increased production from Midland coalfields is being allocated to the northern area, where there is a deficiency to redress.

Some hard coal for annealing is still to be had; the price being about £3. Softer qualities employed in other industrial operations command nearly as much. With many industrialists the question of price is of little moment compared with regularity and approximate uniformity of deliveries. This is especially the case in the metal-working branches. It is because the increased requirements outside industry have made supplies more intermittent and their quality more variable that some manufacturers are deciding it is hopeless to attempt to carry on till the stringency is over.

The efforts which the authorities are making to restrict household consumers to the stipulated rations are not effectual. There is more than enough coal passing through the distributive channels to give those who want it their 1 cwt. per fortnight. Retail prices now rule at from 3s. 3d. to 3s. 9d. per cwt.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 11.

The market for tar products continues without material change. The Government last week issued an order prohibiting the export of pitch except under licence. It is understood that this is to ensure sufficient supplies being available for the manufacture of briquettes in this country. The requirements of the briquette makers will shortly be known; and it will then be seen whether any quantity will remain available for export. The price to-day is about 150s. per ton f.o.b. makers' works.

Creosote continues scarce, and the value to-day is between 8½d. and 9d. per gallon.

Pure benzole is about 3s. per gallon, pure toluole about 3s. 3d. per gallon, 95/160 solvent naphtha 2s. 2d. to 2s. 3d. per gallon, and pyridine 17s. to 18s. per gallon.

Tar Products in the Provinces.

Oct. 11.

The markets for tar products have remained steady over the past week.

There has been a further improvement in the price of pitch, and the demand is still fairly good.

The average values of gas-works products during the week were: Gas-works tar, 105s. 3d. to 110s. 3d. Pitch, East Coast, 152s. 6d. to 155s. f.o.b. West Coast—Manchester, 145s. to 147s. 6d.; **Liverpool**, 147s. 6d. to 150s.; Clyde, 151s. to 153s. Benzole, 90 p.ct., North, 1s. 11d. to 2s.; crude, 65 p.ct. at 120° C., 1s. 4d. to 1s. 5d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 11d. to 2s. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal-tar crude naphtha, in bulk, North, 9d. to 9¼d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 8d. to 8¼d.; salty, 7¼d. to 7¾d.; Scotland, 7⅞d. to 7⅞d. Heavy oils, in bulk, North, 7¼d. to 7¾d. Carbolic acid, 60 p.ct., 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, 90s. to 100s., bags included. Anthracene "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Buxton Gas Undertaking.—The financial statement of the Buxton gas undertaking for the year ended March 31 shows a gross surplus on the year's working of £8573, as against £5250 for the previous year. The net profit was £5976, compared with £2237. The balance in hand on the reserve and renewals fund at the close of the year was £700.

TRADE NOTES.

Lewis M. Ellison Agency.

Messrs. Walker, Crosweller, & Co. have been appointed sole British representatives of Lewis M. Ellison, of Chicago, the manufacturer of the well-known Ellison inclined draught gauges used on boiler and other power plants.

Steel Barrows for Gas-Works.

A new pattern of hot coke barrow, specially designed for lightness on the hands, is marketed by Messrs. Thos. Vickers, of 14, New Street, Birmingham—a firm who manufacture barrows of every description for gas-works purposes.

"T.I.C." Plant for Peterhead.

On the recommendation of the Engineer, Mr. W. S. Easson, the Peterhead Corporation Gas Department have placed an order with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for a "T.I.C." tar plant, treating 10 tons of crude tar per 24 hours, and preparing Road Board tars therefrom.

Ewart's "Supreme" Geyser.

We have received from the makers, Messrs. Ewart & Son, Ltd., a description of their "Supreme" geyser (sealed system), for supplying hot water to bath, basin, and sink. This has been specially designed to meet the demand for a durable and well-made automatic water heater at a low price, and to supply hot water under pressure. The gas supply is under control of the hot water tap, and is shut down when the latter is turned off.

Popularity of Gas.

Makers of gas apparatus and appliances are enjoying the best boom the industry has experienced. One big company estimates that orders received in the past few weeks represent an increase of 25 p.ct. on the normal trade. Gas companies and corporation departments throughout the country report a heavy increase in the sale of fires, cookers, and other appliances In London the number of gas appliances lent on hire by a single company is increasing at the rate of 80,000 a year; and a branch office in one of the most popular suburbs is issuing gas fires at the rate of 200 a week. Gas cookers on hire in Manchester total 24,651, an increase of 1649 during the year; and gas fires, at 7295, show an increase of 1149. Cooking and heating appliances in use in Glasgow number 394,371; and during the last twelve months 7775 orders have been given, making an increase of 2417 over the figures of the previous twelve months. Birmingham's Gas Department has completed a record year, having sold 13,400 million c.ft. of gas. For the first time, the number of gas fires in use in that city has passed the 100,000 mark, while nearly twice as many (199,000) cookers and water heaters are now installed. A large demand for cooking and heating appliances is reported from Nottingham, where the Corporation has installed over 3000 gas fires and gas cookers under a hire-purchase system; and at present the undertaking has about 50,000 cookers out on hire. To cope with the enormous demand for automatic heaters and ventilating gas fires on hire, many corporations have been compelled to apply to the Ministry of Health for powers to negotiate substantial loans for the purchase of appliances..

Back to Dr. Sunshine.

"New houses should not be built with smoky, extravagant coal ranges and fires," declared Dr. C. S. Thomson, Medical Officer of Health for Deptford, speaking at the Borough Hall, Deptford, on Wednesday, Oct. 6, in connection with the local Health Week movement. Dr. Thomson declared that the smoke evil was the greatest enemy of city dwellers, and that domestic smoke was greater in quantity and more harmful in quality than factory smoke. It was estimated that smoke caused one million pounds' worth of damage every year in Manchester, and four million pounds' worth in London. It was curious that some years ago a Departmental Committee on Smoke recommended that no building scheme should be sanctioned unless provision was made for the adoption of smokeless methods, except where the central authority thought it impracticable. Unfortunately, plans had since been passed perpetuating the old features. "The fact is that the open kitchen range is out of date," said Dr. Thomson. "It not only wastes coal and causes smoke, but its efficiency is only 7 p.ct. of what it should be. The back boiler behind the kitchen range is very wasteful of coal, and does not provide enough water for hot baths. Cooking by gas is far better than by the kitchen range. The Government, the local authorities, and private builders must provide houses from the point of view of fuel economy and smokelessness." Prescribing the heating arrangements for new houses, Dr. Thomson said that they should have one coal grate of small fuel capacity, fitted with draught regulators, and there should be gas fires in the other rooms of the house. Gas, for intermittent use, was cheaper and handier than coal fires. Dealing with the town planning question, Dr. Thomson said that new houses should enable people to live under conditions of health, both physical and mental, affording means of reasonable recreation and enjoyment. Areas should be planned in open formation. Pleasant surroundings were wanted with more space and more scope for recreation. Garden suburbs led to beneficial effects on health and happiness. People would then get back to sunshine.

It is stated that Preston was the first borough in the country (outside London) to illuminate its streets with gas, for in 1816 its roads were lighted in this way. Much of the credit for this enterprise was due to the initiative of the Rev. J. Dunn, of Stonyhurst. Originally, Preston's gas-works were in Avenham Lane. Thirty years afterwards an extension was erected in Walker Street; and new works are now being erected by the Company in Hennel Lane.

Oven Burners.

Messrs. Radiation Ltd. have published a booklet in which they suggest that it is bad policy to have two burners in gas ovens fitted with a bottom-flue outlet. Here are the main points set out in the booklet: 1. With two-burner construction there is a loss of cooking space on each side of the oven, and the additional dead space thus created prevents the maximum efficiency being attained. 2. With two-burner ovens fitted with a bottom-flue outlet, an adequate factor of safety against smothering can only be secured by a complicated construction with a multiplication of parts. 3. Very low consumptions are required for certain cooking operations. With two burners the consumption cannot be reduced with safety to the same extent as with one. 4. With two burners, satisfactory automatic control of oven conditions cannot be attained. 5. Burners, shields, injectors, and their accessories have to be duplicated.

Gas Views of the "Tuam Herald."

The following is taken from a leader in the "Tuam Herald" for Sept. 25. "In face of . . . the experience of American cities and our own large ones, we cannot but consider that it is an unwise policy for the Tuam Electric Company and all such companies not to acquire the local gas-works wherever practicable, and utilize them as supplemental sources of supply of heat for domestic use, as is the custom all over the civilized world. If in our modern houses gas stoves were erected and used, the cost of fuel consequent on the use of coal for cooking, which is becoming every year more and more expensive, would be reduced by at least one-half, if not more. As it is, it is a lamentable waste of money to use a coal or turf fire for cooking which a handy gas stove, as in the millions of houses all over the world, can better supply. All these large cities only employ gas because they find it means greater economy and a vast saving of labour. The ever-rising cost of coal is becoming serious; and wherever it can be prevented, it should be a matter that a prudent and careful householder should try for economy sake to avoid. A coal fire is a waste of fuel, while a gas stove can readily and cheaply be used for the purpose; and it is a matter of serious consideration for the coming winter whether every wise and saving householder should not at once instal gas stoves. Local gas companies should make a profitable business of it by supplying such a cheap source of fuel for domestic use. Where the gas companies have, as in Tuam has been the case, shut up, it would be a wiser thing for the rival power to acquire the concern, and supply the public with gas for cooking and domestic purposes, as in all the English and American towns and cities is the custom this very day."

Rochester, Chatham, and Gillingham Gas Company.—This Company's issue of £30,000 consolidated ordinary stock was over-subscribed; the total amount applied for being £34,233. The tenders ranged from £101 down to the minimum of £92 10s. per £100.

Cookery Lectures at Brighton.—Last week the autumn session of free lectures was commenced at the showrooms in Church Street, Brighton, of the Brighton and Hove General Gas Company. These lectures will be given on Tuesday and Thursday afternoons at 3 o'clock, and on Wednesday evenings at 7.

Buxton Boys at the Gas-Works.—The Buxton Rotary Club's "Boys' Week" commenced on Oct. 4, when a large party of youngsters visited the gas-works. These they inspected, in charge of the Borough Gas Engineer (Mr. Shaw) and his Assistants, who explained the various stages in the production of gas.

Bedford District Gas Company.—The Directors of the Company have instructed Messrs. A. & W. Richards to offer for sale by tender £20,000 6 p.ct. preference stock (irredeemable) in the Company. The minimum price of issue is par. Tenders must be received by Messrs. Richards, at 37, Walbrook, E.C. 4, not later than eleven o'clock on Thursday, Oct. 21.

Glenboig Union Fire-Clay Company, Ltd.—The report of the Directors for the year ended Aug. 31 shows the profit to have been £28,152 (including £6416 brought forward, less Directors' and Auditors' fees). The Directors recommend that this should be disposed of as follows: To depreciation, £1500; to Imperial taxation reserve, £2000; in payment of dividend at the rate of 17½ p.ct., less income-tax, £21,000; and in carrying forward to next year, £3652.

Cirencester Gas Company, Ltd.—In their annual report for the year ended June 30, the Directors record a profit on the year's working of £2774. Interest on the debentures, and interim dividends at the rates of £5, £2 10s., and £3 10s. p.ct. respectively on the several classes of shares have been paid, and the Directors recommend the payment of final dividends at the same rates. The consumption of gas, they say, continues to increase satisfactorily. The shortage of coal for domestic purposes has increased the calls upon gas, but the large stock of coal held by the Company at the commencement of the strike has enabled the supply of gas to be continued without restriction.

London County Council and the Sale of Coal.—Reporting on the London County Council (General Powers) Act, 1926, the Parliamentary Committee say that the only petition deposited against the Bill in the House of Commons was by the Society of Coal Merchants, who had opposed in the House of Lords; the opposition being directed against clause 53 (sale of coal). Amendments were, however, agreed providing for the deletion of the suggested power to make bye-laws, and providing further that in any proceedings for selling coal containing or having admixed therewith an amount of slack or rock or incombustible matter which, having regard to all the circumstances of the case, constitutes an undue proportion to the total weight sold, the law shall not be deemed to have been contravened unless within a reasonable period after the delivery of such coal to the purchaser he complains in writing to the Council or to the City Corporation (as the case may be) that such a contravention has been committed. In the circumstances, the Society withdrew their petition.

Free State Coal Difficulties.

A short time ago, Mr. George Airth, Manager of the Dundalk Gas Company, and the Hon. Secretary of the Irish Gas Managers' Association, approached the Ministry of Industry and Commerce of Southern Ireland with a view to securing a continuance of summer time throughout October, or that as an alternative an attempt be made by the Free State to get the embargo on coal shipments from cross-channel ports alleviated. He was unsuccessful; and the outlook in many Free State gas concerns is serious, writes a correspondent. In an interview, Mr. Airth expressed the opinion that, so far as England was concerned, the embargo would not be lifted until the storage capacity in general utility works, such as gas-works and electric light works, &c., was practically normal again. Restrictions were slightly altered in favour of the North, but so far as the Free State was concerned they were on their last legs. "In my opinion," he added, "we are going to bear the brunt of this in the Free State." The English Government will not supply coal to us so long as there is any possibility of their own people being kept without it. It will be at least a month or five weeks after the strike is over before supplies will begin to come to Ireland. Unless the strike is settled soon, a large portion of Ireland will without doubt be short of coal for the manufacture of gas, and considerable inconvenience will be felt by users of gas." Mr. Airth also expressed the opinion that coal which would arrive in Ireland after the settlement of the strike would not be up to the customary standard. Owing to the advance in the cost of coal in consequence of the strike, the Dundalk Gas Company have advanced the price of gas from 5s. 7½d. to 6s. 3d. per 1000 c.ft. Imported coals are costing the Company approximately 127 p.ct. over the original contract rates which prevailed prior to the strike. The embargo on transport of coal from England and Scotland to Northern Ireland and the Free State has naturally made the situation difficult. As a result of this embargo, a large cargo which had been on order at Glasgow for the Dundalk Company has been cut off.

Gas Lamp Breakages at Oakworth.—Discussion took place at a recent meeting of the Oakworth Urban District Council on the large amount of wilful damage to street gas lamps. A list of recent breakages presented to the meeting showed that no less than 71 panes of glass had been broken, the bulk of the damage being in the Oldfield district. In the case of some lamps, all the panes had been broken; and in a few lamps the gas fittings had been torn away and thrown into adjoining fields. It was decided to issue a public warning that prosecutions would be instituted against persons caught indulging in this kind of amusement.

Buxton Gas Undertaking and the Coal Strike.—At a recent meeting of the Buxton Town Council general satisfaction was expressed that the Gas Committee had been able so far to carry on the gas undertaking despite the difficulties due to the mining dispute, without increasing the price of gas. However, Alderman Wall (Chairman of the Gas Committee) intimated that the position was becoming so serious that if there was no improvement by November, they would be compelled to increase the price. The work of Mr. Shaw (Borough Gas Engineer) in obtaining supplies of coal, and in staving off the increase in the price of gas, was keenly appreciated by the Council, who left the whole matter of deciding whether there should be an increase or not in the hands of the Gas Committee.

Coal Strike Effects at Shipley.—Complaints having been voiced of poor quality gas produced by the Shipley Urban District Council, it was explained at a meeting of the Council last week that the deficiency in quality was entirely due to the effects of the coal strike. For fourteen weeks, said Mr. E. Hyde (Chairman of the Gas Committee), supply had been maintained from coal in hand, and then foreign coal had had to be bought—coal which enabled maintenance of a gas supply, but not maintenance of the same quality. To cover the gas requirements to the end of October, £15,000 had had to be spent, whereas a similar quantity of English coal, at the normal pre-strike price, would have cost only £5400. They had an increased income of some £3100 from sales of coke to the end of September, leaving £6500 to be found from other sources.

Owing to the coal strike, the Letterkenny Urban Council have decided to cut-off gas supplies.

The Carleton Parish Council has forwarded an objection to the Board of Trade against the application of Poulton Council to increase further the price of gas.

Over forty members of the Engineering and Scientific Association of Ireland paid a visit of inspection to the Alliance and Dublin Consumers' Gas Company's works at Ringsend last week.

The Helston Gas Department, presenting their balance-sheet to the Town Council, reported that, after paying all interest charges and instalments of principal on loan, they had made a profit of £120.

It was stated at a meeting of the Darlington Town Council on Oct. 7 that since the beginning of the coal stoppage 15,250 tons of coal had been purchased by the gas-works. The extra cost had amounted to £20,500.

Plymouth magistrates last week took a lenient view of the case of Walter Eastlake, a greaser in the employ of the Plymouth and Stonehouse Gas Light and Coke Company, who was charged with stealing a pressure gauge and 45 lbs. of old lead, valued at £1 0s. 6d. He had a wife and four children, and his character had been irreproachable during his seven years' service with the Company, so the Bench bound him over for twelve months. Eastlake said he had got into financial difficulties, and the Chief Constable said he had borrowed £5 from a moneylender, to whom he had repaid £7 5s.

STOCK MARKET REPORT.

AN easier tendency prevailed on the Stock Exchange last week, and the old account wound up in an unsatisfactory manner. This was attributed to the scarcity of business; sellers being more numerous than buyers. It is clear, however, that money is available for investment, as is evidenced by the way any attractive new issues are snapped up. This is illustrated by the success of the City of Tokyo 5½ p.cts. loan. Colonial and Corporation loans are not so eagerly sought after; and the Wolverhampton Corporation may congratulate themselves on the comparative success of their issue, only 16 p.ct. being left with the underwriters. The capitalization of the reserves of the Kensington and Knightsbridge Company under the London Electricity Acts caused considerable activity in the various electric companies' shares, and this is expected to continue.

In the Gas Market there were more transactions recorded than usual. Prices, however, continue on the low side. In view of the difficulty in obtaining foreign coal at reasonable prices, this is not surprising; but as the receipts for the principal product (coke) have improved materially, it is anticipated that satisfactory accounts will be forthcoming for the current year. There were few changes in the quotations, the premier stock (Gas Light and Coke ordinary) was marked down ½; but Bristol 5 p.ct. maximum advanced 1 point at the local exchange.

The following transactions were recorded during the week.

On Monday, British 104, Commercial 3¼ p.ct. 75½, 3 p.ct. debenture 55½, European 6⅝, Gas Light and Coke 84½, 84¼, 84½, 84⅜, 3¼ p.ct. 60¼, 60½, 3 p.ct. debenture 58¼, 59, Imperial Continental 127½, 128¼, Primitiva 12s., 12s. 1½d., 12s. 3d., South Metropolitan 91¼, 91⅜, 91½, 91¾, Tottenham "B" 90½, 91, Tuscan 20s., 6 p.ct. debenture 66, Wandsworth "A" 123. Supplementary prices, Gas Light and Coke 5 p.ct. debenture (interest from July 8, 1926) 100¾.

On Tuesday, Bombay 21s., Continental Union 29, Gas Light and Coke 84, 84¼, 84⅛, 84⅜, 3¼ p.ct. 59¾, 4 p.ct. preference 76¼, 3 p.ct. debenture 59, Hastings 5 p.ct. 89½, 90, Montevideo 81, Primitiva 12s., 12s. 0⅜d., 12s. 3d., 12s. 4½d., South Metropolitan 91⅜, 91½, 3 p.ct. debenture 58½, Swansea 6¼ p.ct. debenture 101, 101¼, Tottenham "B" 90, Wandsworth "B" 102, 3 p.ct. debenture 54½. Supplementary prices, Guildford 97½, Rochester, Chatham 8 p.ct. debenture 103, Walton-on-Thames "A" 14¼.

On Wednesday, Alliance and Dublin 8⅓, Bombay 20s. 9d., 21s., Bournemouth 7 p.ct. 12½, Commercial 3¼ p.ct. 75⅜, Croydon 97, maximum dividend 79½, Gas Light and Coke 84, 84¼, 84⅜, 3 p.ct. debenture 58½, 59½, Imperial Continental 128, 128½, 129, Liverpool 7 p.ct. preference 101, Newcastle 3¼ p.ct. 70, Primitiva 11s. 10¼d., 12s., 12s. 1½d., 12s. 3d., South Metropolitan 91⅛, South Suburban 5 p.ct. 96, 97¾. Supplementary prices, Gas Light and Coke 5 p.ct. debenture (interest from July 8, 1926) 100¾, Standard Gas and Electric preferred 56.

On Thursday, Bombay 21s. 3d., Bournemouth "B" 12⅛, British 104¼, Commercial 4 p.ct. 78, Continental Union 28, 7 p.ct. preference 84½, Croydon 98, maximum dividend 80½, Gas Light and Coke 84, 84¼, 84⅛, 84⅜, 3¼ p.ct. 59¾, 60½, 4 p.ct. preference 75⅞, 76, Imperial Continental 128, 129, Maidstone 5 p.ct. 114, Newcastle 3¼ p.ct. 70⅝, Primitiva 12s., 12s. 0⅜d., 12s. 1½d., 12s. 3d., South Metropolitan 91⅛, Swansea 7 p.ct. preference 101, Tottenham "B" 90, 91, 4 p.ct. debenture 74. Supplementary prices, Montevideo 6 p.ct. debenture 98½.

On Friday, Bombay 20s. 9d., European 6⅝, Gas Light and Coke 84⅜, 84½, 4 p.ct. preference 75½, Imperial Continental 128, 129, Maidstone 5 p.ct. 114, 114½, Malta and Mediterranean 5⅜, 5⅝, Primitiva 11s. 10½d., 12s., 12s. 1½d., 12s. 3d., 4 p.ct. (Buenos Ayres) new debenture 71, South Metropolitan 91⅜, 92, Swansea 7 p.ct. preference 101½, 102, Tottenham 4 p.ct. debenture 74½, Wandsworth 5 p.ct. 122, 3½ p.ct. 102, 3 p.ct. debenture 54½. Supplementary prices, Gas Light and Coke 5 p.ct. debenture (ranking for interest from Sept. 1, 1926) 100½, 100¾, Montevideo 6 p.ct. debenture 98.

In Lombard Street loan rates declined as usual at the end of the week, and in the afternoon on Friday balances were freely offered at 3½ p.ct. The continued outflow of gold and the uncertainty of the monetary outlook brought about an increase in the average rate at which Treasury Bill allotments were made. This rate—£4 15s. 11·13d. p.ct.—was the highest for a considerable period, and was 1s. 8½d. p.ct. above the average rate for the previous week. The announcement caused discount rates to rise, and the final quotation was 4 11/16 p.ct.

The Foreign Exchanges were firmer than usual. Italian lire were the most conspicuous, the Milan rate closing at 123—a decline of 3¼. The Paris cheque was ⅜ lower at 168 9/16, and the Belgian exchange ¾ lower at 175. Sterling on New York was steady at 4.85 7/32.

Silver, which depreciated all the week, closed at 25 11/16d. per oz., the lowest price for over eleven years. Gold remained at the nominal price of 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends, Prev. Hf.Yr	Dividends, Last Hf. Yr.	NAME.	Quotations, Oct. 8.	Rise or Fall on week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Aug. 12	5	5	Aldershot 5 p.c. max. C.	72—75	..	
322,992	"	"	4	4	Do. 4 p.c. Pref.	65—70	..	..
1,651,868	"	Sept. 30	6½	6½	Alliance & Dublin Ord.	88—88*	..	..
374,000	"	July 8	4	4	Do. 4 p.c. Deb.	67—70	..	83
300,000	1	May 6	4	4	Bombay, Ltd.	1—1¼	..	..
170,000	10	Aug. 26	1/7½	1/7½	Bournemouth 5 p.c.	11¾—12⅜	+⅛	20/9—21/3
500,050	10	"	8½	8½	Do. B 7 p.c.	11¾—12⅜	..	..
275,000	10	"	7	7	Do. Pref. 6 p.c.	11—12	..	12½—12⅝
50,000	Stk.	June 24	6	6	Do. 3 p.c. Deb.	54—57	..	..
162,025	"	"	3	3	Do. 4 p.c. Deb.	74—77	..	..
214,740	"	"	4	4	Brighton & Hove Orig.	163—168	..	..
244,300	"	Aug. 26	12	12	Do. A Ord.	125—130	..	..
1,327,500	"	"	9	9	Bristol 5 p.c. max.	86½—87½a	+1	..
885,000	"	July 22	5	5	British Ord.	102—107*	..	104—104½
100,000	"	Sept. 30	7	8	Do. 7 p.c. Pref.	114—119	..	..
120,000	"	June 24	7	7	Do. 4 p.c. Red. Deb.	68—73	..	..
100,000	"	"	4	4	Cape Town, Ltd.	6¼—7½	..	..
100,000	10	June 10	6	8	Do. 4½ p.c. Pref.	6—7	..	..
150,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
626,880	Stk.	June 24	4½	4½	Cardiff Con. Ord.	94—97	..	..
237,880	"	July 22	6	6	Do. 7½ p.c. Red. Deb.	99—102	..	..
157,150	"	June 24	7½	7½	Chester 5 p.c. Ord.	88—93b	..	..
79,185	1	Aug. 12	6½	5	Colombo Ltd. Ord.	27/—29/-*	..	..
24,495	1	Sept. 30	1/3/-	1/2/-	Do. 7 p.c. Pref.	20/—22/-*	..	..
1,513,280	Stk.	Aug. 12	1/4⅜	1/4⅜	Commercial 4 p.c. Cap.	77—80	..	..
560,000	"	"	5½	5½	Do. 3½ p.c. Cap.	74—77	..	78
475,000	"	June 24	5/3/4	5/3/4	Do 3 p.c. Deb.	55—58	..	75½—75⅞
800,000	"	Sept. 30	3	3	Continental Union, Ltd.	27—32*	..	55½
200,000	"	"	2	1	Do. 7 p.c. Pref.	82—85*	+1	28—29
737,150	"	Aug. 12	7	7	Croydon sliding scale	95—98	..	84½
403,100	"	"	6½	6½	Do. max. div.	78—81	..	97—98
492,270	"	Aug. 26	5	5	Derby Con.	107—109c	..	79¼—80½
55,000	"	June 24	9	6	Do. Deb.	78—75c	..	..
209,000	"	Sept. 16	4	4	East Hull Ord. 5 p.c.	84—87	..	..
50,000	"	June 24	5	5	Eastbourne 5 p.c. Deb.	91—96	..	..
1,002,180	10	Sept. 30	5	5	European, Ltd.	6—7*	..	..
18,788,960	Stk.	Aug. 12	4/17/4	5/1/4	Gas Light & Coke 4 p.c. Ord.	83¾—85½	-½	84—84⅞
5,602,620	"	"	3½	3½	Do. 3½ p.c. max.	58—61	..	59⅜—60½
181,315	"	June 24	4	4	Do. ¼ p.c. Con. Pref.	74—77	..	75⅜—76½
180,000	"	"	3	3	Do. 3 p.c. Con. Deb.	58—61	..	58½—59½
42,000	"	—	—	—	Do. 6 p.c. Br'st'd Rd. Db.	100—105	..	..
82,500	"	—	10	10	Do. 10 p.c. Bonds.	..	..	..
258,740	"	Aug. 26	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
70,000	"	"	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	87—92	..	..
173,200	Stk.	June 10	5½	5½	Do. 3½ p.c. Conv.	66—71	..	89½—90
1,976,000	"	Sept. 16	†10	†10	Hongkong & China, Ltd.	19½—20⅛	..	..
226,170	"	May 20	5	5	Hornsey Con. 3½ p.c.	67—69	..	..
235,242	"	Aug. 12	10	‡10	Imperial Continental Cap.	126—131	..	..
2,127,340	"	Aug. 12	3½	3½	Do. 3½ p.c. Red. Deb.	68—71	+1	127½—129
600,000	"	Aug. 12	6½	6½	Lea Bridge 5 p.c. Ord.	92—97	..	..
165,786	"	Sept. 30	5½	5½	Liverpool 5 p.c. Ord.	78—79b	..	..
63,480	"	Aug. 26	7	7	Do. 7 p.c. Red. Pref.	100—102‡*	..	..
75,000	"	June 24	9	8	Maidstone 5 p.c. Cap.	112—117	..	101
541,920	Stk.	June 24	3	3	Do. 3 p.c. Deb.	53—58	..	114—114½
2,051,315	"	May 20	‡6	‡7	Malta & Mediterranean	5⅛—5⅜	..	..
360,929	"	Aug. 12	‡6	‡6	Montevideo, Ltd.	80—83	+1	5 17/32—5⅝
529,705	"	"	5	5	Newcastle & Gateshead Con.	71—71½d	+½	81
15,000	"	June 24	4	4	Do. 4 p.c. Pref.	73—74d	..	70—70⅜
91,530	"	Aug. 26	3½	3½	Do. 3½ p.c. Deb.	68¼—69d	+⅜	..
800,000	"	"	11½	11½	North Middlesex 10 p.c.	151—156	..	..
188,120	"	May 6	8 3/5b	8 3/5b	Do. 7 p.c.	103—114	..	..
414,500	"	June 24	9	7	Oriental, Ltd.	97—102	..	..
336,732	"	Aug. 26	7½	7	Plym'th & Ston'house 5 p.c.	108—113	..	..
3,389,909	"	"	—	7/4/0	Portsm'thCon.Stk.4p.c.Std.	102—107	..	..
382,200	1	"	—	5/0/0	Do. 5 p.c. max.	78—81	..	..
600,000	100	June 1	4	—	Primitiva Ord.	11/6—12/6	..	..
180,305	Stk.	July 22	4	4	Do. 4 p.c. Red. Deb.	83—85	..	11/10½—12/4½
256,847	"	June 24	4	4	Do. 4 p.c. Red. Deb. 1911	69—71	..	..
150,000	"	"	4	4	Do. B. Aires 4 p.c. Rd. Db.	69—71	..	..
125,000	10	Sept. 30	6	4	Do. R'r P'te 4 p.c. Rd. Db.	69—71	..	71
270,000	50	July 1	5	6	San Paulo 6 p.c. Pref.	7½—8*	..	..
419,968	Stk.	Sept. 16	6	5	Do. 5 p.c. Red. Deb.	46—49	..	..
1,047,000	"	"	6	5½	Sheffield A	98—100e	..	..
90,000	"	"	6	5½	Do. B	98—100e	..	..
6,609,995	10	June 11	4	5½	Do. C	98—100e	..	..
1,895,445	Stk.	Aug. 12	7	—	South African	5—7	..	..
734,000	"	July 8	3	5	South Met. Ord.	90¾—92¼	..	..
91,500	"	Sept. 16	6½	3	Do. 3 p.c. Deb.	57—60	..	91⅛—92
1,187,795	"	Aug. 12	8½	6½	Do. 6½ p.c. Red. Db.	100—102	..	58½
868,837	"	Aug. 12	6½	8½	South Shields Con.	114—116d	..	..
647,740	"	June 24	5	6½	South Suburban Ord. 5 p.c.	96—99	..	..
121,275	"	Mar. 18	5	5	Do. 5 p.c. Deb.	92—95	..	96—97⅜
250,000	"	June 24	4	5	South'mpton Ord. 5 p.c.max	77—80	..	..
200,000	"	Aug. 26	7	4	Do. 4 p.c. Deb.	68—73	..	..
120,000	"	June 24	6½	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
882,275	"	July 22	7½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	101—102
150,000	"	"	5½	7½	Tottenham District A 5 p.c.	105—110	..	101—101½
181,255	"	"	5½	6½	Do. B 3½ p.c.	88—91	..	..
258,251	"	June 10	4	5½	Do. 5½ p.c. Pref.	99—101	..	90—91
197,294	"	Aug. 26	5	4	Do. 4 p.c. Deb.	73—76	..	..
88,330	"	Aug. 26	6⅔	5	Tynemouth Con. and New	66—67d	..	74—74½
91,800	"	"	5	6⅔	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
	"	"	6⅔	5	Do. 5 p.c. pref.	80—85	..	..
30,000				6⅔	Do. 5 p.c. Maidenh'd	85—90	..	..
255,636	"	July 8	8½	8½	Wandsworth, Wimbledon, and Epsom—			
412,450	"	"	7	7	Wandsworth A 5 p.c.	122—127	..	..
352,000	"	"	5/19/0	5/19/0	Do. B 3½ p.c.	102—107	..	122—123
98,000	"	"	6⅔	6⅔	Do. C and New	88—93	..	102
88,416	"	"	7½	7½	Wimbledon 5 p.c.	98—103	..	..
	"	June 24	3	3	Epsom 5 p.c.	104—109	..	..
					3 p.c. Deb.	54—57	..	54½

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *Ex. div. † Paid free of income-tax. ‡ Plus 8½ p.ct. p.a. special dividend.

NOW READY.

Size 7½ in. by 5¼ in. In Dark Green Cloth. Gilt Lettered.

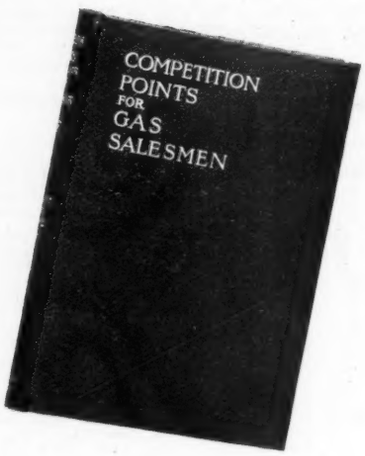
COMPETITION POINTS FOR GAS SALESMEN

SECOND EDITION.

Revised and brought up to date.

BY

A. F. BEZANT and N. S. SMITH, B.Sc.



Price **7s. 6d.** post free.

WALTER KING, Ltd., "Gas Salesman" Offices, 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON TUESDAY, to ensure insertion in the following day's issue.

Orders to Alter or Stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Monday.

UNDISPLAYED ADVERTISEMENTS: Situations Wanted, Six Lines and under (about 36 words), 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum, 4s. 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

		ONE YEAR.	HALF-YEAR.	QUARTER.
United Kingdom & Ireland	Advance Rate:	35/-	18/-	10/-
	Credit Rate:	40/-	21/-	11/6
Dominions & Colonies & U.S.A Payable in Advance		35/-	—	—
Other Countries in the Postal Union. Payable in Advance		40/-	22/6	12/6

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Central 6055

GAS PURIFICATION & CHEMICAL CO., LTD.,
PALMERSTON HOUSE,
34, OLD BROAD STREET, LONDON, E.C.2.

OXIDE OF IRON
AS SUPPLIED BY THIS COMPANY FOR OVER 50 YEARS ON SALE OR LOAN.

SPENT OXIDE
PURCHASED IN ANY DISTRICT.

Telegrams: "PURIFICATION STOCK, LONDON."
Telephone: LONDON WALL, 9144.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

PATENTS, Trade Marks. Inventions
Advice, Handbook and Consultations free. KING'S PATENT AGENCY LTD., Director B. T. KING, C.I.M.E., Regd. Patent Agent, G.B., U.S., and Can., 146A, QUEEN VICTORIA ST., E.C. 4, and 6, QUALITY CT. (next Pat. Off.), LONDON, W.C. 40 years' refs. 'Phone Cent. 682.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815, Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 243 Holborn.
And 8, St. Nicholas Buildings, Newcastle-on-Tyne.

SULPHURIC ACID.
SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD., 36, Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—ROYAL 1166.

OXIDE OF IRON.
SPENT OXIDE BOUGHT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Royal 1484.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Royal 1484.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.
(See also advertisement on p. 125.)
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Royal 1484.

GEORGE WILSON GAS METERS, Ltd.
for
GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS.
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER,"
and at 268, Stockport Road, MANCHESTER.
Telephone: RUSHOLME 976. Telegrams: "GASMETER,"
and 46 & 47, Auckland Street, LONDON, S.E. 11.
Telephone: HOP 647. Telegrams: "GASEOUS LAMB."